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The OIL AND GAS JOURNAL

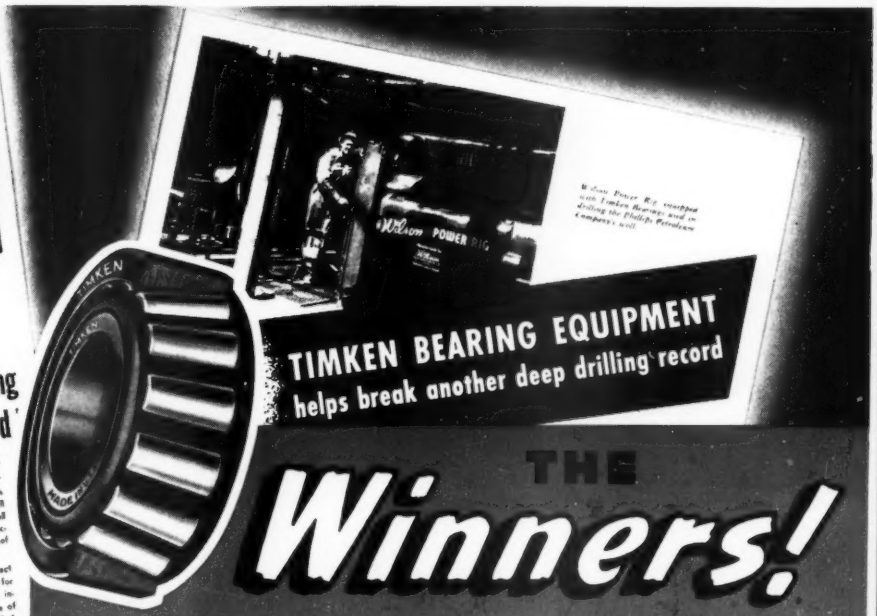
Again TIMKEN Bearing Equipment Breaks The Deep-Drilling Record

TIMKEN Tapered Roller Bearings have participated in many of the oil industry's most outstanding accomplishments, including this one.

a 12" x 12" Ideal Ajax Twin Cylinder Steam Engine equipped with [illegible] crank shaft, earned all of the wall of the well 12 feet of

8 YEARS SERVICE then BROKE WORLD'S DEEP-DRILLING RECORD

Pictured above is the Timken Bearing Equi 12" x 12" Twin Cylinder Steam Engine that for drilling of Continental Oil Company's [illegible] in Kern County, California. This angu



TIMKEN BEARING EQUIPMENT helps break another deep drilling record

THE Winners!

Wherever deep drilling records are established in the oil fields, Timken Tapered Roller Bearings are there. Look for the trade-mark "TIMKEN" on every bearing that goes in your equipment.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

Another World's Record for a TIMKEN BEARING EQUIPPED DRILLING ENGINE 16,655 Feet!

MEET THE LATEST DEEP DRILLING RECORD HOLDER—TIMKEN BEARING EQUIPPED

timken Bearings

WERE THERE AGAIN!

On another Deep Drilling Record

By keeping important equipment operating steadily at maximum speed with minimum attention for lubrication and maintenance, Timken Tapered Roller Bearings were definite factors in the drilling of the Standard Oil Company of California's Colen Lovee No. 1 well to the world's record depth of 18,558 feet.

In the "Oilwell" No. 150-B Swivel they safely supported the longest and heaviest string of drill pipe ever used and kept it turning smoothly as the load constantly became heavier. Incidentally, this particular swivel has been in heavy-duty service since 1941.

Timken Bearings also are used at the main crank shaft positions and on the crankpins of the Gardner-Denver 14" x 16" twin steam drilling engine used on this job. Both the Oil Well Supply Company and the Gardner-Denver Company have used Timken Bearings for years.

Timken Bearings will help put record performance-ability into any kind of oil field equipment. Make sure you have them in the new equipment you manufacture or buy. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TIMKEN BEARING EQUIPPED

This photograph shows the Ideal-Ajax 12" x 12" twin steam engine with crank shaft mounted on TIMKEN Bearings which furnished the power for drilling McGonigle No. 12 in the Ventura Gold, California, deepest oil producer.

completed on January 17th the well

minerals, pumps, compressors, crown blocks and traveling blocks.

They are definite factors of economy, dependability and long equipment life because they reduce friction and wear to the point of elimination; carry radial, thrust and combined loads with a wide

the Ideal-Ajax 14 x 14 steam engine the Phillips Petroleum Company's [illegible] well on a depth of 16,655 feet. Tapered Roller Bearing

mounted radial, thrust and combined loads to hold moving parts in

HOWCO

ACCURACY

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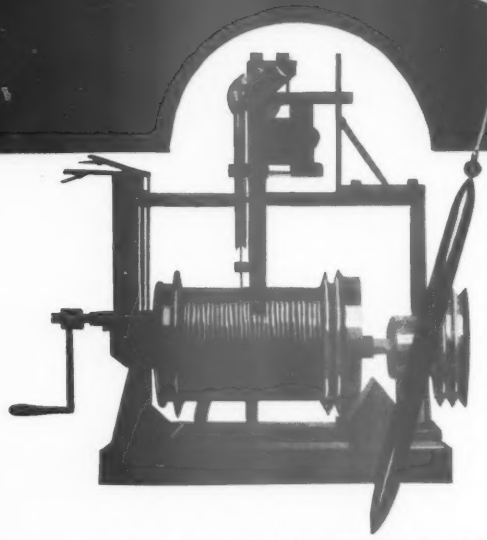

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DUNCAN, OKLAHOMA

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THE OIL AND GAS JOURNAL

Technology and Marketing

THOSE who were associated with the beginnings of the natural-gasoline industry 35 to 40 years ago and who have not been in a position to keep in touch with its trends in recent years, would have been confounded by current developments as revealed at the Dallas N.G.A.A. meeting. It is far cry from the initial commercial operations of 1908 when liquids, of largely unknown properties, were compressed out of the casing-head gas to the varied activities now associated with natural gasoline.

The start of this youngest and rapidly expanding division of the oil business came at a time when the motor-fuel demands of the automobile industry threatened to exceed the supplies available from petroleum refineries. Fortunately low prices did not come until the manufacturing arts had been improved and costs lowered. Over the past 20 years the incentive of wide profits has been nonexistent and operators as a group have had to use every manufacturing and distributing facility at their command to keep pace with competitive operations.

The ramifications of today's natural-gasoline activities are apparent from the registration list of the Dallas meeting. With the possible exception of exploration, technologists representing every phase of the oil industry were present. Operators of cycling plants have most of the problems of the several hundred owners of natural-gasoline plants along with those peculiar to their own processing practices.

Refinery technologists were present because gas-recovery operations are an increasingly important phase of modern refinery processing with its emphasis on cracking and the resulting production of a wide range of hydrocarbons. Refiners and the natural-gasoline manufacturers have many common interests in the disposal of their products.

Also attending the annual sessions were those seeking additional information regarding gaseous hydrocarbons in connection with pressure maintenance, repressuring, and other field operations. Thus the technology of light hydrocarbons spreads across the entire front of oil operations.

The need now of the gasoline manufacturers, as it always has been, is to be as realistic and competent in the economic phases of their operations as they have been in manufacturing methods. The trend in marketing, too often, has been to manufacture a product and then try to find out what could be done with it.

For months the oil business has suffered from a situation in which there have not been sufficient peacetime demands for the light hydrocarbons whose output greatly increased under the impetus of war. Natural-gasoline and associated operations no longer constitute unimportant activities and marketing needs must be controlling in future expansion.

Oil Industry Drive Against TEL Reduction Gains Momentum

WASHINGTON.—The oil industry's drive against the reduced tetraethyl lead allocation which has drawn increasing protests from numerous organizations and individuals is showing signs of stirring official Washington into action.

While a week ago, the industry was regarded as fighting to prevent its low 3,500-ton April allocation from being cut even further during May, it is now regarded as possible that the quota for tetraethyl lead may be raised to 3,750 tons for May and June. After conferences between oil industry representatives and Government officials in Washington, John M. Snyder, director of War Mobilization and Reconversion, announced a nationwide scrap and salvage drive and other steps to increase imports and domestic production.

Prospects for a significant long-range increase in lead allocations for ethyl fluid are, however, considered dim. April allocation was 3,500 tons, equivalent to 10,500 per quarter. First quarter allocation was 10,000 tons and 3,000 additional was obtained on appeal, but the appeals "kitty" was 15,000 tons the first quarter but only 5,000 tons this quarter, and all lead-using industries are demanding higher allocations.

CPA estimates total lead supply this year at 860,000 tons against screened demand for 1,040,000 tons. First quarter allocations totaled 257,000 tons and second quarter will be about 232,000, or total of 489,000, leaving only 371,000 tons for the second half of the year.

The lead situation came before the National Petroleum Association's meeting last week in Cleveland. The group was told Ethyl Corp. had been promised the same amount of lead in May as in April. In Dallas last week, directors of the Natural Gasoline Association of America went on record urging that Civilian Production Administration do what it could to alleviate the shortage.

Numerous state and regional trade and oil jobber groups have thrown their weight into the fight against reduced allocations. In Houston, the Gulf Coast Refiners Association issued a statement asserting the cut in tetraethyl lead to about 60 per cent of demand "means that independent refiners without catalytic processes face shutdown."

Basis of most oil industry protests rests on the fact lead for anti-knock gasoline consumes only about 6 per cent of the nation's total supply, and that an additional 1 per cent would allow operations to continue without dislocation to the industry and serious effect on the gasoline consuming public. A general reduction of octane rating of gasoline already has gone into effect in many areas.

May lead allocations are expected to be announced by CPA next week. Previously quotas were set for quarterly periods, but in view of the shortage, CPA announced only the April allocation, placing that for tetraethyl lead at 3,500 tons against a demand estimated at more than 5,000 tons.

Longer-Period Allocations Sought

In its statement, the Gulf Coast Refiners group called on the Government to make allocations for a longer period. "Short term allocations of lead are inadequate," the association said. ". . . Refiners must look ahead and plan more than 30 days if they are to operate economically."

Here last week, W. R. Boyd, Jr., president of the American Petroleum Institute, accompanied by 10 industry representatives and officials of the American Automobile Association and the American Trucking Association, met with a number of Government officials, including Snyder. After the conference, Boyd said the group thoroughly discussed the status of the lead situation, the reasons why there was an acute shortage and means which might bring additional lead to the general stockpile.

"Director Snyder assigned for exploration to various Government agencies concerned specific suggestions made in the course of the discussion," he said. "The petroleum industry may be asked to participate in a nationally organized and conducted drive which would attempt to add to the national stockpile a substantial quantity of secondary or scrap lead. . . . Representatives of Ethyl Corp. and representative oil refiners continue to carry on discussions with officials of CPA in the hope that conditions will justify a large percentage allocation of lead available for petroleum uses."

Allocation of only a little more metallic lead for the production of ethyl fluid will make it unnecessary for the Government to institute a whole series of drastic and costly controls of gasoline production and distribution, CPA was informed by Walter Hochuli of The Texas Co. and A. P. Frame of Cities Service Oil Co.

At the request of the Chemical Division of CPA these two refinery and marketing experts, former PAW officials, reviewed the TEL situation and CPA's recent octane-limitation order, and concluded that continuation of the current limitation of ethyl fluid production will play havoc with the gasoline industry and will call for government controls at least as extensive as those during the war.

As scarce as lead is, they concluded, the Government will have fewer problems by increasing the allocation for tetraethyl than by attempting to follow through with the controls which are implicit in the octane order which took effect April 1 for a month's period.

Gasoline Prices Up in Some Areas

REFINERY gasoline prices were at a slightly higher level in Gulf Coast and New York areas this week following a rise of ⅛ cent in quotations on both regular and premium grades.

New prices at New York, Philadelphia, and Baltimore were reported at 6⅜ cents for 76-78 octane, and 7⅜ cents for 80-83 octane. On the Gulf Coast, ethyl was reported at 6¼ cents, and regular was at 5½ cents.

In the Mid-Continent area, gasoline was generally unchanged at prices ranging from 5¼ to 5⅝ cents, although marketers reported small quantities of gasoline still being offered at 5 cents and below. Predictions of an imminent upward turn in this market, however, continued to be heard.

The statistical picture for April 13 offered encouragement to the petroleum sales group. Gasoline stocks were down 1,782,000 bbl. to 102,444,000 bbl., and daily gasoline demand was reported at a 6-month high at 2,162,000 bbl. The daily demand represented an increase of 132,000 bbl. over the previous week. The figures substantiated other reports of unexpectedly high consumption.

Despite a national gasoline inventory generally regarded as excessive, California marketers were reported concerned about low stock in that particular area. A record-breaking consumption is forecast for the summer in the Pacific Coast area, and observers say some marketing organizations, unable to accumulate sizable inventories during the winter, may be hard pressed to meet demand.

Texas' Production for May to Continue High at 2,103,120 Bbl.

by Dahl M. Duff

AUSTIN, Tex.—The Texas Railroad Commission last week followed through on its earlier action in increasing Texas production and set a May allowable designed to take care of all requirements for crude from the nation's largest producing state.

The May allowable was placed at 2,248,993 bbl. daily, about 80,000 bbl. greater than current allowed production. Estimated underproduction of 6.5 per cent, or 145,873 bbl., is expected to reduce total to 2,103,120 bbl.

Setting of the May allowable came at a hearing which was featured by a proposal for a 30-day shutdown of Texas wells in June if oil-price control is not lifted and by statements of representatives of several refineries that they are running short of crude.

In contrast to purchasers, refinery representatives, and major producers, the independent producers reiterated their continued opposition to higher production but indicated they will go along with the commission's change in policy for the time being. Again, their heaviest opposition was against OPA which has been blamed for most of the jumbled Texas production situation the last few months.

Four days before the meeting here, the three commissioners took their case against oil-price control to President Truman in a telegram in which they asked that OPA controls on petroleum and all its products be ended immediately "in order that further wasteful overproduction of gasoline may be avoided." Their two-page telegram said the plea was made "in the interest of supplying the Navy's fuel-oil requirements and in freeing independent operators and independent refiners from the shackles of control that is resulting in the oil industry fast coming into the hands of a few majors and driving the independent operator and refiner out of their field."

McCarthy Proposed Shutdown

The plan for a 30-day Texas production shutdown came from J. H. McCarthy, Houston, appearing as chairman and spokesman of a statewide committee of independent operators. He suggested that the commission grant the Navy all oil necessary so long as aboveground storage does not increase, that this policy continue until June 1, and that, if controls have not been eliminated, the shutdown follow to reduce aboveground storage from 220,000,000 to 160,000,000 bbl.

McCarthy's drastic proposal was followed by a request that the commission not increase its May allowable. This was made by H. J. Porter, president of the Texas Association of Independent Oil Producers and Royalty Owners, which completed its organization a day earlier in Austin with a primary aim of eliminating OPA controls from oil.

A number of refiners testified as to their needs for additional crude. Among them were representatives of Republic Oil & Refining Co., Eastern States Petroleum Corp., American Liberty Oil Co., Crown Central Petroleum Corp., Cities Service Oil Co., Pan-American Oil Co., Sinclair Prairie Oil Co., Atlantic Refining Co., Talco Pipe Line Co., McMurray Refining Co., Stanolind Crude Oil Purchasing Co., Cosden Petroleum Corp., Shell Oil Co., Inc., and Phillips Petroleum Co. Humble Oil & Refining Co. reported its purchasing nominations for May in all districts were approximately the same as for April.

The commission's May allowable was 53,129 bbl. greater than the demand forecast issued by the United States Bureau of Mines.

Purchasers nominations, which the commission says it has found generally exceed requirements by about 10 per cent, totaled 2,352,417 bbl.

In announcing the allowable, Olin Culberson said "we are doing this to try to fill the needs of the Navy, War Shipping Administration, the independent refiner and everybody else. We hope that this increase won't go the way of the April increase, when the major refiners kept it for themselves and let the independent refiner go without."

Statistics compiled by the commission on data submitted by companies at the commission's request showed that of the crude in storage, more than half is in tank bottoms, tanker bottoms, pipe-line fill, and residue. Companies reporting accounting for 113,123,944 bbl. of crude, of which only 48,557,586 bbl. was reported available for processing.

World Trade Restrictions Condemned

NEW YORK.—Restrictions on world trade and foreign exchange which cut nations off from supplies are among the most important causes of pressures which drive peoples toward excesses of nationalism and toward war, officials of Standard Oil Co. (N. J.) this week told stockholders in the company's annual report.

Taking a position against economic blocks and monopolies, the company in its report said "it is out of individual freedom that people draw . . . the willingness to take risks which are characteristics of vigorous producers."

Summarizing company operations, the report also:

Listed consolidated net earnings in 1945 at $154,156,196, equivalent to $5.64 a share, compared with $5.69 a share the previous year. Total 1945 income was $1,635,886,000.

Disclosed refinery runs of 1,120,000 bbl. per day were 5 per cent higher than in 1944 and represented a new company record. Total production also was at a new record level of 995,000 bbl. daily, an increase of 8 per cent.

Revealed for the first time that during 1945 it became possible to obtain from fluid catalytic cracking units outputs approximately 80 per cent above design capacity. This improvement, the report said, can be made for a relatively small cost, and provisions have been made for three of the eight fluid units of affiliates to operate at this higher-than-design capacity.

Called attention to severe damage to company gasoline plants and refineries from bombing in Rumania, Italy, and Hungary, but added the most serious difficulties facing affiliates in Hungary and Rumania were not caused by war damage but by the political situation.

Cited the fact that 95 per cent of the domestic employes who have been discharged from the armed services have returned to the company.

OPA Oil Posts Filled

WASHINGTON.—E. L. Jones, head of the Office of Price Administration's industrial materials section in the Chicago regional office, and Dan F. Kemp, chief counsel of the solid fuels price branch of the agency, have been made price executives in OPA's petroleum price branch. They succeed Eugene Uman, who resigned some time ago, and John P. Barnes, who is leaving the agency late this month. Jones, associated with OPA since 1943, has been president of Blue Ribbon Oil Co., president of Good Oil Co., and Chicago district manager for Western Oil Corp.

Cooperatives File Applications to Drill on Continental Shelf

WASHINGTON. — Applications to drill for oil in 1,500 sq. mi. of ocean bottom off the Gulf Coast of Louisiana have been filed with the Interior Department by 15 farmers' cooperative associations.

The area lies beyond the 3-mile limit which is usually considered to be state sovereignty and is on the continental shelf recently claimed for the United States in a presidential proclamation. The applications state that they are filed subject to the terms of future legislation and regulations which, presumably, will authorize development of the continental shelf.

Each of the coops applied for 100 sq. mi., more or less, and the collective areas sought lie between Lt. 29° 3'N. and Lat. 29° 41'N. and between Long. 93° 16'W. and Long. 94° 28'W.

The claimants are Consumers Cooperative Refinery Association, Loveland, Tex.; M. F. A. Oil Co., Columbia, Mo.; Cooperative Refinery Association, Kansas City; Midland Cooperative Wholesale, Minneapolis; Farmers Central Exchange, Inc., St. Paul; Southern States Cooperative, Inc., Richmond; Farm Bureau Cooperative Association, Inc., Columbus; Pennsylvania Farm Bureau Cooperative Association, Harrisburg; Cooperative Oil Association, Inc., Caldwell, Idaho; Indiana Farm Bureau Cooperative Association, Inc., Indianapolis; Pacific Supply Cooperative, Walla Walla, Wash.; Cotton Producers Association, Atlanta; Farmers Union State Exchange, Omaha; Central Cooperative Wholesale, Superior, Wisc.; and Farm Bureau Services, Inc., Lansing, Mich.

Each of the coops state in its application that it "has made research upon the possibilities of the existence of structures within the described area and has already done research as to mechanical methods of drilling for and producing petroleum under waters of the continental shelf," and that the "applicant has arranged for and is willing to proceed with the above-described exploratory work."

The applications were all filed by Alfred A. Kiltz, Evansville attorney, and the announcement was made in the House by Representative Charles M. LaFollette of Indiana.

In making the announcement LaFollette stressed that cooperatives operating in 33 states and having a membership of 4,075,000 farmers have taken the first step to develop the continental shelf whereas no major oil company has yet filed any such claims; that the coops are ready to develop submarine oil resources without expense to the Government; that they will leave the question of royalties to future determination; and that this will prevent the major oil companies from gaining monopolistic control over the floor of the ocean.

Clardy Elected Head of Stanolind Pipe Line Co.

Bruce C. Clardy, Houston independent operator and former assistant director of supply and transportation of Petroleum Administration for War, this week was elected president and a director of Stanolind Pipe Line Co.

B. C. CLARDY

Frank O. Prior resigned as president of the Standard Oil Co. (Ind.) subsidiary but will continue as chairman of the pipeline-company board. Clardy, who has already taken over his official duties, attended University of Texas in 1914-17 and 1919-20, served in the marines during the First World War, and went to work in the oil fields in Kansas in 1916.

In 1926, he became chief deputy supervisor of the oil and gas division of the Texas Railroad Commission and 3 years later, manager of the crude-oil department of Shell Pipe Line Co. In 1936, he organized the drilling and producing firm of Heyser, Heard & Clardy, Inc., in Dallas. In Washington in 1943 and 1944, he had charge of buying and selling crude and products carried in the big-inch lines.

Indiana Standard Sets Up Fellowships in 17 Schools

CHICAGO.—Twenty-two graduate fellowships at 17 educational institutions providing amounts averaging about $1,500 a year have been established by Standard Oil Co. (Ind.), Dr. Robert E. Wilson, chairman of the board, announced here this week.

Fellowships in chemistry have been established at Northwestern, Illinois, Chicago, Wayne, Ohio State, Wisconsin, Iowa State, and Johns Hopkins; in chemical engineering at Massachusetts Institute of Technology, Minnesota, Illinois, Cornell, Carnegie Tech, and Princeton; in engineering at Michigan, Minnesota, Iowa, Illinois, Purdue, and Illinois Institute of Technology; in civil engineering at Purdue; and in marketing and management at Northwestern.

Indiana Standard's production subsidiary, Stanolind Oil & Gas Co., also will sponsor fellowships in geology at Yale, in chemistry at Pennsylvania State, in geophysics at California Institute of Technology, in electronics at Harvard, in accounting at Pennsylvania, and in petroleum engineering at Oklahoma, Michigan, and Texas.

Announcement of another oil company graduate fellowship was made at Golden, Colo., by Ben H. Parker, president of Colorado School of Mines. Standard Oil Co. of California is providing the geology fellowship.

Holman Calls for Reducing Curbs on Foreign Capital

AUSTIN, Tex. — Eugene Holman, president of Standard Oil Co. (N. J.), told a University of Texas conference here last week that nations restricting foreign capital and investments will ultimately handicap their own industrial and economic development.

"If the world, and Latin America in particular, is to produce the oil it can and should, the long-range outlook toward the oil business should not be one of increasing restrictions but of reducing them . . ." he said at the meeting on postwar inter-American relations.

OPA Lubricants Advisory Committee Appointed

WASHINGTON.—Eight oil-company executives have been named members of a national lubricants industry advisory committee to assist Office of Price Administration on price ceiling problems in the field.

Chairman of the group is R. B. Ogden, Socony-Vacuum Oil Co., Inc. Others are James Norris, Refiners Marketing Co., vice chairman; James R. Taylor, W. H. Barber Co., secretary-treasurer; Victor Benson, Pennzoil Co.; Marshall McArthur, Quaker Petroleum Co.; Harry Moir, Pure Oil Co.; J. A. Bornmann, Elk Refining Co.; and Walter Smith, Tide Water Associated Oil Co.

Group Marks Anniversary

WICHITA, Kans.—The Petroleum Accountants Society of Kansas observed its tenth anniversary here this week at a dinner meeting honoring past presidents of the organization. The society with members representing 35 producing, refining, and contractor companies, heard a discussion of the Anglo-American oil agreement by A. S. Ritchie of D. R. M. Co.

THIS WEEK

REGULATION— Davies presses for liquidation of PAW by April 30 deadline. . . . Recommends peacetime oil agency office in the Department of Interior as coordinating office and for liaison with the industry. . . . Makes it plain no additional federal controls are needed. . . . ¶Texas Railroad Commission again boosts allowable to take care of all demands for the state's crude in May. . . . Commissioners telegraph President Truman appealing for end to oil-price control. . . . Spokesman for independent producers propose state shutdown if control not eliminated by June. . . . ¶Justice Department discloses A.P.I. attorneys and antitrust division officials are conferring on possible settlement of the Government's suit against 22 major companies. . . .

PRICES— Moves in Washington foreshadow decontrol of the oil industry. . . . Joint meeting of OPA's crude and refining advisory committees on decontrol set for May 3 and 4. . . . OPA extension law expected to force decontrol if not ordered sooner by price agency. . . . ¶House mauls OPA bill, and limitations which would assure oil freedom from control appear favored by Senate. . . . ¶Fate of stripper-well subsidy in doubt since it is tied to price ceilings. . . .

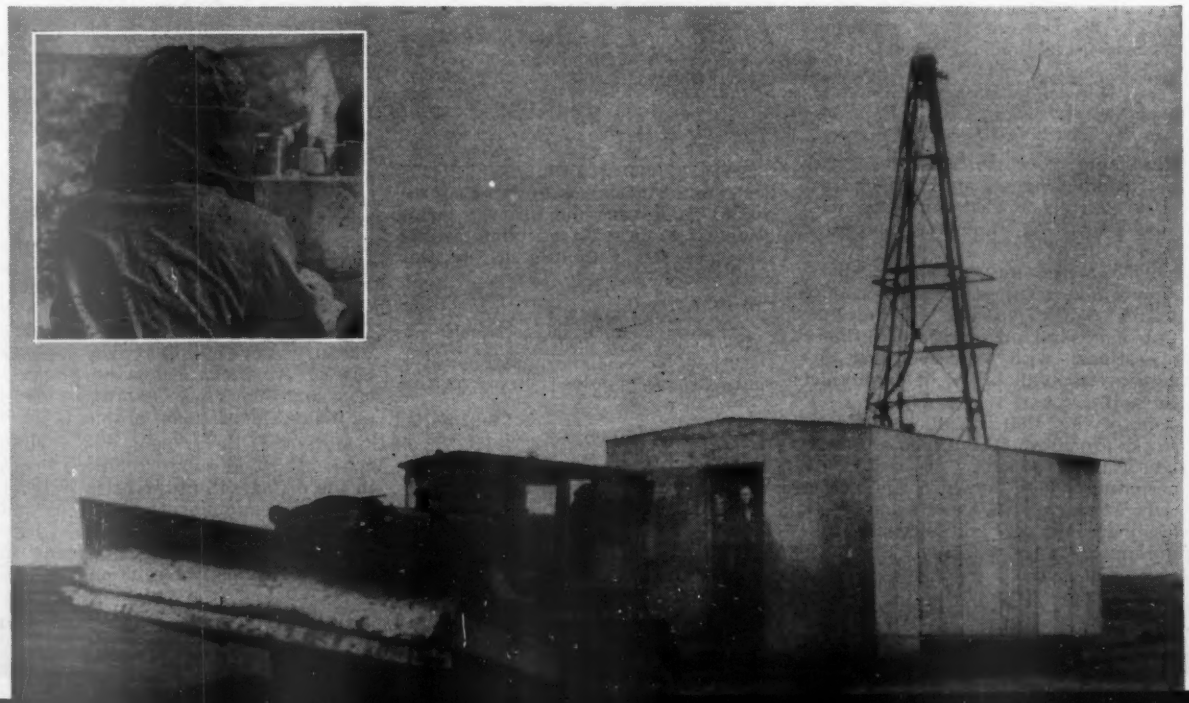
TRANSPORTATION— FPC sets hearing April 27 on Big Inch Gas, Inc., plan to use big-inch lines for natural gas. . . . N.P.A. in Cleveland also asks that lines be used for gas or not used at all. . . . ¶James E. Kilday, Justice Department attorney, charges rail and major oil interests work together to maintain "rate wall" to keep independent refiners in Louisiana, Arkansas, and Texas from southeastern coast markets. . . . Statement made in opposition to pending bill to free railroads from antitrust laws in rate agreements. . . . ¶In Detroit, Michigan-Wisconsin Pipe Line Co. unwraps voluminous data in FPC hearing on its proposed $71,000,000 line from Texas gas fields. . . . Panhandle Eastern Pipe Line Co. charges the application is an effort to "oust" it from serving the Michigan area.

PRODUCTION— Permits to drill on Gulf Coast continental shelf sought by 15 cooperative groups in applications to Interior Department. . . . Area is beyond 3-mile limit which was recently claimed by United States. . . .

INTERNATIONAL— Iran challenges British hold on Bahrein protectorate. . . . Starts taxing oil from Bahrein at rate now levied on Anglo-Iranian production. . . . ¶Labor trouble feared in Venezuela in view of government repeal of ban on strikes. . . .

REFINING—Strong protests against lead allocation bring action in Washington. . . . Chances are for May quotas at least as high as April, but long-term lead supply outlook is gloomy. . . . CPA reported relieving individual cases of hardship by means of special lead "kitty."

In exploring the Navy's petroleum reserve in northern Alaska, core-drilling equipment is placed in wanigans, small sled-mounted structures which are drawn over the tundra and ice by tractors as shown here. Another distinctive feature of Alaskan operations are the mosquitoes which seem to thrive as well in the Arctic as they do in the Tropics. In the inset picture, S. H. Folk, ensign, U. S. Navy, examines cores at Umiat, Alaska, while mosquitoes examine Ensign Folk, or at any rate, his coat. The core-drilling project was carried out in a country where the formation is frozen permanently to a depth of about 600 ft. It was found that all depths reached by core drills the holes would freeze in less than an hour after completion, making it imperative that no drill stem or drill pipe be left in the hole without continuous circulation



Higher Demand for Oil Products Assured, Coleman Tells N.P.A.

by Warren W. Burns

CLEVELAND. — The petroleum industry can look forward to a relatively high and increasing level of demand in the future.

This statement, made at the April 18-19 meeting of the National Petroleum Association here, which marked the forty-third such semiannual gathering, by Stewart P. Coleman, director of Standard Oil Co. (N. J.), was met with enthusiasm. However, industrial relations, not economics, were the chief concern of this year's meeting as evidenced by the number of speakers who dealt with the subject and the considerable amount of interest evidenced by N.P.A. members. Labor-industry relations comprised the dominant theme, and refinery officials were particularly responsive.

On the economic side, the 243 N.P.A. members present heard Coleman say: "As reconversion proceeds and demands increase in the future, it would appear that the impact of the cessation of the war on the petroleum industry has not been serious and that the industry can look forward to a relatively high and increasing level of demand in the future."

However, a rather serious maladjustment in product inventories in relation to the demand for individual products, does exist, Coleman said, explaining his statements by Table 1.

TABLE 1—STOCKS OF MAJOR PETROLEUM PRODUCTS
(In thousands of barrels)

	Gasoline	Kerosene	Distillate	Residual fuel oil
March 31, 1941	98,700	6,700*	29,800	31,600
March 31, 1945	97,400	6,900	26,700	35,500
March 31, 1946	104,700	9,300	28,500	33,300

*Excludes bulk terminal stocks.

This table shows stocks for the major petroleum products at the end of the first quarter of 1946 compared with stocks at this time for preceding years.

An earlier adjustment in price would have resulted in either a more normal stock position for gasoline, Coleman said, or increased refinery operations, with corresponding increases in availability of byproduct fuel oil.

Observing that residual - fuel - oil stocks are substantially below prewar levels and even today are below the minimum levels to which they were reduced during the war as a result of high military and shipping requirements, the Jersey Standard economist said:

"The continuing high demands by U. S. Navy and War Shipping Administration are such that the normal minimum byproduct fuel-oil production from U. S. refineries is not adequate to supply these demands, with the consequent result that residual-fuel-oil supplies from U. S. refineries must be augmented by the addition of a distillate fuel oil.

"Clearly, price adjustments adequate to compensate for the distillate fuel added to the residual fuel are necessary to avoid serious financial loss to the U. S. refining industry on the additional fuel oil required above normal byproduct production. It is hoped that this will be accomplished by the recently reported procedure whereby Office of Price Administration will permit payment by the U. S. Navy of prices for fuel oil which will cover the additional value of distillate blended with residual fuel to meet Navy demands."

Refinery Operations Forecast

The speaker presented specifically prepared figures covering a forecast of refinery operations in the Petroleum Administration for War's Districts 1, 2, and 3, where the major impact of increased fuel-oil demand, after applying maximum supplies from other sources, is being and will continue to be met during 1946. Table 2 shows historical and projected required crude runs and refinery yields designed to provide adequate working stock levels by the end of this year:

TABLE 2
(Figures in thousands of barrels)

	1st. qtr. 1946	Last 9 mos. 1946	Year 1946
Refinery runs	3,730,000	3,547,000	3,592,000
Yields of:			
Gasoline	40.6%	39.3%	39.7%
Kerosene	5.1	5.8	6.4
Distillate	18.1	15.6	16.3
Residual	22.0	24.7	24.0

On the basis of this table, which indicates that it will be necessary to convert distillate fuel into residual fuel, the quantity required to be converted through the remainder of this year, was estimated at about 100,000 bbl. daily. This condition is abnormal, but it is expected to last for several months, and possibly throughout the year.

Fuel-oil demands outside the U. S. are so high because of unanticipated military and shipping requirements, Coleman said, and in spite of maximum foreign production the amounts available for import into the U. S. are less than the import requirements. The net result has been that the deficiency in world fuel-oil supply against demand has fallen on the U. S. with the consequence that more fuel-oil production is required from U. S. refineries than corresponds to the economic minimum attainable with existing available cracking facilities. The speaker continued:

"As the demands for fuel oil for military and shipping revert to a normal peacetime basis and as the fuel-oil supply capacity of foreign sources is increased, this condition will be corrected and it will then be possible for U. S. refineries to revert to the more economic operation of producing the minimum of heavy fuel possible when supplying requirements of gasoline and other light products.

"In the future, with the increasing utilization of catalytic cracking in U. S. refineries, it will be economic to produce still higher yields of gasoline and other light products at the expense of residual fuel oil, thus conserving U. S. crude-oil supplies for the production of the maximum higher value products, relying on foreign fuel-oil supplies to supplement balanced economic U. S. refinery operations to meet demands for this product."

The necessity for such abnormal production of fuel oil will be eliminated, it was said, as the capacity of foreign supply sources is increased in relation to world-wide fuel oil demands, which, in turn, are expected to be lower next year.

The high-light of the addresses and panel discussions on industrial relations was the feeling that the oil industry, as well as other industries, should develop an industry-wide code of labor relations, a code which could be followed by management and labor alike in working out plans leading to the adjustments of their various problems. This thought was shared by Otto S. Beyer, member of Department of Labor's special oil-industry fact-finding board; Fred G. Clarke, American Economic Foundation, and others who expressed views of management labor problems.

Moreover, Beyer said that such a code of "good labor relations" was in the offing, citing the railway labor act as an example of how labor and management adjust their differences.

James Tanham, vice president in charge of industrial relations of The

Texas Co., who addressed the meeting on "The Future of Industrial Relations in the Petroleum Industry," said that strikes occur in violation of law — indicating the War Labor Disputes Act — because leaders feel that the act has not been and will not be enforced against them. Tanham's proposed solution to this was "equal responsibility under the law," for labor as well as management. In other words, "the enforceable responsibility for contract commitments," and if this requires legislation, the speaker was for it.

Treatment of Refinery Foremen

Treatment of refinery foremen as part of management was touched upon several times. Tanham advocated it as did others, with W. J. Wilson, Ohio Oil Co., speaking of the value of certain psychological tests to determine the suitability of refinery workers for this type of job.

Beyer spoke briefly of the oil industry's labor problems with younger unions which are experiencing "growing pains," and added that the oil industry's "dance of rhetoric" difficulties with the federal Government —which commenced about 1941—are slated to continue. Moreover, he thought that industry would soon experience a certain standardization tendency, particularly in its refineries, with regard to wage rates. J. Howard Marshall, president, Ashland Oil & Refining Co., said he feared the Government will look at large refineries and by some means devise a set of wages and working conditions and try to apply them on a national scale. If so, the smaller refiner's present degree of flexibility will be completely lost, he explained.

Indicating that individual plant settlement of labor problems, over national settlement, is more desirable, MacLean Houston, production manager of United Refining Co., briefly related his experience in negotiating labor contracts. A new contract, which United recently negotiated with the Operating Engineers, an A.F.L. affiliate, contains an unusual security clause.

This security clause, Houston explained, was brought about due to the trouble resulting from the rise and fall in United's refinery union strength. Whenever union membership dropped, some outside interest entered to commence organizing, and as a result much time was lost. Consequently, new workers at United now become union members after their first 60 days' employment and remain members for a minimum of 6 months. As a result of this, union membership at United is above 50 per cent and it is believed that this is strong enough to keep any would-be organizers from the premises.

T. G. Shirriffs, assistant industrial relations director, Standard Oil Co. of Ohio, spoke in considerable detail of the methods applied by his company in negotiating contracts, emphasizing that individual plant settlement had been found most satistory, for labor and management alike.

Porter L. Howard, Sun Oil Co., and former director of Office of Defense Transportation's tank-truck division, reviewed the wartime transportation situation and said he believed that if the present relative costs as between tank-car and tank-truck oil transportation continue, oil transportation will revert to the prewar pattern, except in areas where new product pipe lines have been or are being built. He said that in such cases tank trucks will gain in relative position.

J. F. Winchester, Standard Oil Co. of New Jersey, said that within the next 4 years his company plans to replace every piece of highway equipment now being used.

The railroad's Interstate Commerce Commission petition to hike freight rates 25 per cent were discussed briefly with the consensus being that the railroads apparently are driving oil business to tank-truck transportation, and while the costs of the latter are up, they are well under 25 per cent.

Lack of Cooperation Charged

J. H. Reppert, associate director of OPA's fuel-price division, decried the "lack of cooperation" given him by the oil industry. Specifically he was referring the "inadequate response" shown by refiners to answer some questionnaire recently sent them. Reppert said that he hoped "to have all the facts" by the time of the May 3-4 Chicago meeting with refiners and producers, ostensibly being called to form a pattern for the decentralization of oil-industry price control.

A lively battle of words ensued between Reppert and various NPA members, with the later emphasizing that OPA always knew about "every detail of all U. S. refiners," and that as OPA had declined to do anything in the past, refiners were a bit apathetic over filling out long questionnaires again.

Merle Thorpe, director of business development, Cities Service Oil Co., said the oil industry should prepare itself for a new era of competition when the hazards of reconversion are overcome.

Albert J. Browning, former brigadier general, and now director of Office of Domestic Commerce, in Department of Commerce, spoke on "Government and Business in the Postwar World."

Reviewing the April 18 White House meeting with OPA, CPA and Reconversion Director Snyder, over the lead situation, Paul Blazer, chairman, Ashland Oil & Refining Co., said Ethyl Corp. had been promised the same amount of lead in May as in April. John Day, secretary of Western Petroleum Refiners' Association, said that the Allies had found 15,000 tons of lead in Japan and that the State Department had asked General MacArthur to send it to the U. S. However, this is not expected to help materially.

Oil men named to fill vacancies on NPA's board of trustees were: J. Howard Marshall, Ashland Oil & Refining Co.; F. W. Bannerat, Jr., Elk Refining Co.; W. W. Vanderveer, Allied Oil Co.; W. H. Bennett, Frontier Fuel Corp.; F. E. Miller, National Refining Co.; C. Z. Hardwicke, Ohio Oil Co.; and S. W. Vochel, Waverly Oil Co.

Just prior to adjourning NPA passed the following resolutions:

1. A demand that OPA relinquish oil-price control.
2. A demand that CPA include some small refineries on proposed committee to discussion situation.
3. A demand that the big and little-inch pipe lines either be used for natural gas or not used at all.
4. A vote of thanks to NPA's entertainment hosts, Allied Oil Co., Canfield Oil Co., National Refining Co., and Standard Oil Co. of Ohio. N. H. Weber, vice president of Pure Oil Co. presented the resolutions.

H. A. Logan, president, United Refining Co., presided, with the following NPA officials assisting: Joseph E. Keller, Donald C. O'Hara and Harry S. Elkins. Fayette B. Dow, general counsel in the Washington office, acted as cochairman and was instrumental in arranging the meeting. The annual meeting is again planned for September at Atlantic City.

Oil Industry's Accident Rate Up, Severity Drops

NEW YORK.—The severity rate of accidents in the petroleum industry declined in 1945, although the frequency rate showed an increase, according to the annual report of the department of accident prevention of the American Petroleum Institute.

Deaths and permanent total disabilities incurred among the 368,133 workers reported were 126, as compared with 136 in 1944 for 346,140 workers. Frequency of accidents rose from 13.57 per 1,000,000 hours worked in 1944, to 14.43 in 1945. The greatest reduction in serious accidents was in the refining branch, where deaths and permanent total disabilities dropped from 64 in 1944 to 40 in 1945. These occurred among 126,365 workers.

Toluene Price Fixed

WASHINGTON. — In an effort to accelerate the disposal of about 15,000,000 gal. of toluene owned by the Government, War Assets Administration has set a single fixed tank-car price of 10 cents a gallon for the surplus.

International

WORLD-WIDE OIL DEVELOPMENTS

Seven Austrian Refineries Running 16,000 Bbl. Daily

NEW YORK.—From Austria's seven refineries now on stream, the daily crude throughput is reliably reported to be in excess of 16,000 bbl. The largest of these, at Lobau, is relatively new and currently is running around 5,500 bbl. daily. It is owned by Rag (Rohoelgewinunngs Akitien Gesellschaft) jointly owned by Socony-Vacuum Oil Co. and the Shell group. Other refineries in Austria, their ownership, and throughput follow:

Kagran, near Vienna, Vacuum Oil Co., had a prewar capacity of 1,200 bbl. and is now believed to be in excess of this.

Floridsorf, in a town of the same name, is owned by Shell and is another refinery which is believed to be exceeding its prewar throughput of 2,000 bbl. daily.

Korneuburg, in a town of the same name, was jointly owned by Austrians and Rumanians and went under the name of Creitulminier. The prewar daily throughput was 1,000 bbl., but no current figures are available.

Nova, in the town of Schwechat, was owned by Austrian interests and before the war had a rated capacity of 2,500 bbl. daily.

Santo, in Vosendorff, also owned by Austrian interests, had a prewar capacity of 2,000 bbl. daily. Currently no figures are available.

Donsau, in a town of the same name, was owned by Moosbierbaum Oil Co., controlled by German interests. Neither prewar nor current figures are available here.

Iran Reasserts Claim To Bahrein, Taxes Oil

TEHERAN.—The Iran Government has reasserted its claim to Bahrein with the announcement that oil produced on the island and shipped to the Iranian mainland will be taxed at the rate now collected on production of Anglo-Iranian Oil Co. in Southern Iran.

Iran's present tax on Anglo-Iranian is 80 cents a barrel plus 20 per cent of the annual net revenue of the company. Under the new decree, the Iranian Government will make no attempt to tax the oil at its source.

Production on Bahrein is by a subsidiary jointly owned by Standard Oil Co. of California and The Texas Co. The island is a sandbar 27 miles long and 10 miles wide, lying on the Arabian side of the Persian Gulf. By reaffirming its claim to the island, Iran challenged the hold that Britain has exercised through an agreement with its Sheikh since 1892. Production on Bahrein is approximating 20,000 bbl. daily. Royalty is paid to the Sheikh.

Peron's Organ Discloses Bill Proposing Oil Nationalization

BUENOS AIRES.—The newspaper El Laborista—the organ of President-elect Peron—said last week a bill asking for nationalization of Argentina's petroleum resources has been drafted and will be introduced shortly after the new congress convenes.

Japan's Synthetic Output Virtually at Standstill

WASHINGTON.—Japan's once-flourishing synthetic oil industry is operating at only a fraction of even its present capacity because of the shortage of coal.

In August 1944 a total of 16 plants were partly or wholly in operation, but bomb damage has left a present capacity estimated at 35,000 to 40,000 kiloliters a year (220,167 to 251,620 bbl.) Near the coal fields on Hokkaido, only two plants are reported operating. The Takikawa plant of Nippon Jinzo Sekiyu is producing about 50 kiloliters (314 bbl.) of 40-octane fuel a year; the Rumoi plant, owned by the same company, is operating on a similarly small scale.

The synthetic plants were allocated 70,000 tons of coal for the last quarter of 1945 but the allocation was not met. The Japanese obtain average yields of synthetic crude from coal of 8 to 13 per cent by weight. Three methods are employed in the industry—hydrogenation or direct liquefaction, Fischer-Tropsch synthesis, and low temperature carbonization. The Japanese had sought self sufficiency in gasoline and heavy oil through use of the synthetic plants, indigenous production, and alcohol. Reports made to officials here say the industry has no immediate prospect of obtaining coal except for those plants located near mines.

Special Refinery Believed Needed for Joya Mair Oil

WASHINGTON.—A special refinery will be necessary to process crude from the Joya Mair field in India because of its unusual characteristics, according to reports reaching here.

Geologists and engineers of Attock Oil Co. are said to be continuing research on the problem. The crude from the field in the Punjab was reported to be one of the most asphaltic encountered in commercial quantities in the world. It has a specific gravity of 0.950 and is highly viscous, black oil that rapidly loses its lighter constituents on exposure and becomes solid pitch.

Operations Resumed at Shell Plant in Holland

ROTTERDAM.—Bataafsche Petroleum Mij.'s Pernis refinery near here went back on stream early this month for the first time since the cessation of hostilities. This is a Shell group property and before the war had a daily rated throughput of 15,000 bbl. daily. Current plans call for the export of petroleum products to exceed the 1939 export figure of 1,800,000 tons (about 12,600,000 bbl.

The plant was heavily damaged during the war, but repair of the cracking units placed it in operating condition, according to an official of the Government Bureau for Mineral Oil Products. With the general improvement in the oil supply, the Government allowed an increase in the gasoline ration in January. At Coevorden, in Drente, crude production is reported at about 8,400 bbl. a month, a fraction of the estimated 1,050,000 bbl. required for the country each month.

Gasoline Shortage Hits Mexico in Pemex Strike

MEXICO CITY. — Some tourists traveling between Mexico City and Laredo, Tex., were stranded last week as a result of Mexico's gasoline shortage which coincided with a strike of production workers for Pemex, government-owned oil monopoly.

The acute shortage continued even after the oil workers returned to their jobs from a 24-hour walkout. The Government's tourist department ordered special gasoline supplies for motorists visiting the country.

Service stations were awaiting supplies from refineries which were shut down in sympathy with the striking workers. Pemex management was accused by the union of violating collective bargaining contracts. The strike ended after Efrain Buenrostro, Pemex manager, agreed to negotiation directly with the union group which is asking pay increases.

Phillips Releases Acreage In Colombia to Lessors

BARTLESVILLE, Okla. — According to an announcement by Phillips Petroleum Co. 666,000 acres of Phillips Colombian Oil Co.'s Simiti lease in Colombia, originally covering an estimated 960,000 acres, have been released to the lessors, which include the Leonard, Benedum, and Trees interests.

The original contract for the lease was made in July 1944. The Simiti tract is located along the Magdalena River in the municipality of Bodega Central, Department of Bolivar. The release of the acreage was made after a preliminary examination of the area by field geologists. The company has no present plans for drilling wells on any of the retained acreage.

La Dorado-Manizales Line Under Study in Colombia

BOGOTA.—Preliminary data on a proposed 2-in. products pipe line which would extend 107 miles from La Dorada to Manizales with a difference in elevation of 6,500 ft. has been made public by officials of the Caldas departmental government.

The line is estimated to cost $872,365. La Dorada, a port on the upper Magdalena River, serves as a distribution center. A pipe line to Bogota, about 120 miles from La Dorada, would require a similar investment, it was estimated.

Throughput of the line was placed at 900 bbl. daily. Manizales, the capital, is at an elevation of 7,262 ft., and La Dorada, 762 ft. Seven pump stations would be required. A total of 2,344 bbl. would be needed to fill the line. The total cost was broken down to pipe line, $673,367, three 3,000-bbl. storage tanks at $8,000 each, and the seven stations and housing facilities, $25,000 each.

In engineering data included among departmental figures, the maximum head was calculated for a throughput of 900 bbl. daily of diesel oil. The friction head was figured at 48.28 lb. per mile, and for the 107 miles, 5,166 lb., giving a total of 7,625 lb. with the additional head due to the difference of elevation. For gasoline, the lightest product, at 900 bbl. daily, the total head was calculated at 4,917 lb.

Iraq, Arabia, Colombia Supply Crude to France

PARIS.—For the first 2 months of this year, France imported 262,586 tons (1,837,976 bbl.) of crude oil, according to statistics appearing in the press here. A breakdown of this total by countries of origin shows: Iraq—120,051 tons (840,357 bbl.); Arabia—86,170 tons, (603,190 bbl); and Colombia—14,709 tons (102,963 bbl.) The Colombian crude imports represent the first such shipments since cessation of hostilities.

Before the war the annual throughput of this country's 15 refineries approximated 8,000,000 tons (56,000,000 bbl.) of crude. Imports of finished products in 1938 were over 1,100,000 tons (7,700,000 bbl.) and included high-octane gasoline, fuel oil, gas oil, and lube oils.

January Canadian Output Increases Over December

OTTAWA, Ont.—Canadian oil production in January totaled 680,327 bbl., representing a 2 per cent increase over December but still 23 per cent under the high wartime rate in January 1945.

For the entire year, Canadian production totaled 8,569,197 bbl., against 10,199,404 bbl. in 1944. Production in January 1945 was 881,821 bbl.; in December 1945, 666,869.

Natural gas production in January dropped to 5,640,088,000 cu. ft., from 5,738,260,000 cu. ft. in December and 5,780,541,000 in January 1945. Total production in 1945 was 52,973,699,000 cu. ft., against 45,067,158,000 cu. ft. in 1944.

Venezuelan Strike Feared Over Pay Raise Demands

CARACAS.—The possibility of labor strife in Venezuela's huge oil industry is seen by sources close to American and British oil companies as a result of workers' demands for a $1.75 daily wage raise.

A collective contract signed in November expired last week but it was extended for another month pending

negotiations of a new one. The old contract granted workers a 60-cent daily raise, but the $1.75 increase was demanded by the recent oil workers' congress.

Sources close to the companies are regarding a strike as possible in view of the repeal last month by the Venezuelan Government of its own decree forbidding strikes. Other demands for the workers include better housing, improvement of sanitary conditions in oil fields, and better medical assistance.

Concession Reservations Lifted in Peruvian Code

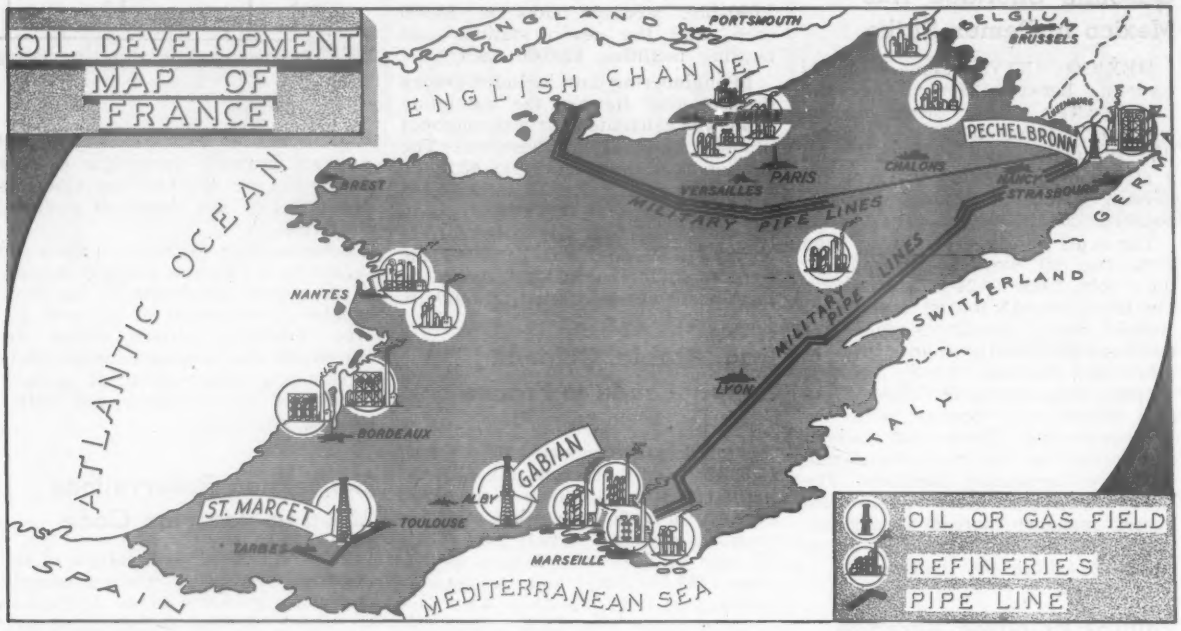
NEW YORK.—The highlight of the Peruvian oil code, drafted largely under the guidance of A. A. Curtice of Hoover, Curtice & Ruby, and now before Peru's Congress, is the current provision to lift reservations contained in Article 12 of WAW 4452, thus enabling the Government to give concessions over Government reserve areas, the concessions, however, being subject to Congressional approval.

Article 12 states: "The executive power may reserve on each petroleum field, according to its importance and location, two or more lots, the exploration and exploitation of which shall be conceded to national companies established with national capital. It may also reserve for direct exploitation by the State the zone or zones which it may consider convenient." A royalty of 12 per cent is believed to have been proposed in current draft of the law which covers all Peru. The 12 per cent royalty, however, would pertain to new concessions. The draft does not propose disturbing status quo otherwise, and affects mostly the Montana region where Ganso Azul is now producing.

Manager for Anglo-Iranian Expelled from Azerbaijan

TEHERAN, Iran.—Mahmour Froughi, for 9 years Azerbaijan manager of Anglo-Iranian Oil Co. in Tabriz, has been expelled from the disputed province by authorities of the Democratic party.

Froughi, an Iranian, said he was stopped by a Russian sentry and taken to the Russian commandant. Released on bail by Democratic officials, he reported being later arrested and spending 9 nights in detention. He said the only reason he could give for his expulsion was that his frequent business trips made officials wrongly suspect him of spying.



French Research Emphasizing Oil Exploration and Utilization Of Petroleum Gas

by Col. Pierre Guillaumat*

RENEWED activity in oil exploration and development in France, with emphasis on the production and utilization of petroleum gas, is indicated by recent accomplishments of the present French petroleum research organization. These include:

1. Improvement of the mining law to give operators more liberal working conditions.

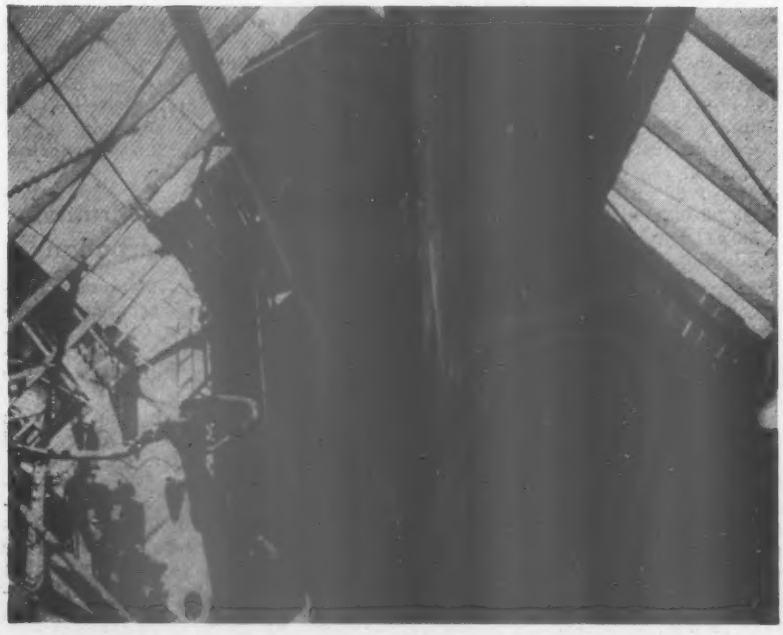
2. The creation, by combining state funds and private capital, of strong research organizations operating in southwest France with the cooperation of Regie Autonome des Petroles (R.A.P.), a government agency which serves as consultant.

3. Establishment of a program to provide drilling equipment and petroleum engineers.

4. Formation of the Bureau des Recherches de Petrole (B.R.P.) which will support the research organizations financially and coordinate their drilling programs, thus assuring the maximum utilization of equipment and engineers.

R.A.P. Operations

At present the R.A.P. is exploring and developing a structure at Saint-Marcet, as well as undertaking new drill tests on nearby structures at Aurignac, Genesac, Proupiary, Plagne and Saint-Martory. The number of rigs is constantly increasing, and early this year six were in operation here. Moreover, in order to speed up the drilling program, R.A.P. has a



Drilling well at St. Gaudens viewed from above. Each length of drill pipe shown measures about 80½ ft. in length

*Director des Carburants.

drilling contract, with "Enterprise Forex" which has another rig and the personnel to operate it.

Following is a summary of operations on the various structures:

Saint-Marcet.—Of the 12 wells completed on this structure, 2 (2 SM and 10 SM) were dry holes and 10 were gas wells. Two of the gas wells (1 SM and 11 SM) flowed some oil, and two encountered indications of light oil made up of a mixture of gasoline and kerosene. A small amount of this light oil was produced from the 12 SM.

Four wells at Saint-Marcet are producing gas with a daily potential of slightly more than 1,000,000 cu. m. (35,318,000 cu. ft.). Cumulative production from this field to the first of the year amounted to 150,000,000 cu. m. (5,250,000,000 cu. ft.) of gas, 12,500,000 liters (21,000 bbl.) of oil, and 1,300,000 kg. (2,860,000 lb.) of butane.

Present daily production of one flowing well is about 3 cu. m. (19 bbl.) of oil and 30,000 cu. m (1,050,000 cu. ft.) of gas. Total production of this well since completion is 2,200 cu. m. (7,260 bbl.) of oil and 6,500,000 cu. m. (227,000,000 cu. ft.) of gas.

Plagne.—The first well here was drilled in 1940 to a depth of 1,987 m. (6,557 ft.). Several showings of gas were encountered in shallow horizons, but sand containing salt water under great pressure was found at the total depth. A second test is now under way and has reached a depth of 1,200 m. (3,960 ft.). Gas-saturated sandstone was drilled through at a depth of 100 m. (328 ft.).

Gensac.—Only three tests have been drilled here and the results were disappointing, although one reached a record depth of 3,090 m. (10,197 ft.).

Aurignac.—A test well on this structure, drilled to a total depth of 2,975 m. (9,818 ft.), penetrated a sandstone at 2,300 m. (7,590 ft.) which showed slight porosity but contained salt water. A volcanic lava was encountered at 500 m. (1,650 ft.) and, since it was still present at the total depth, the well was abandoned. A second test now drilling is located higher on the structure and is below 1,700 m. (5,610 ft.).

Proupiary.—This structure is connected with Saint-Marcet and has been tested with one well which reached a depth of 2,302 m. (7,597 ft.). Porous breccia was encountered during the drilling operations and a test of the zone yielded a large volume of gas.

Saint-Martory.—A test well was under way here early this year and had reached 1,600 m. (5,280 ft.). Since June 1938, a total of 47,000 m. (155,100 ft.), including seven shallow tests in 1942, have been drilled in this area in an effort to locate oil.

S.N.P.A. Operations

The Societe Nationale des Petroles D'Aquitaine (S.N.P.A.) was founded in 1941 and began drilling operations immediately. In order to facilitate deep drilling, a rig formerly used by Societe de Pechelbronn was employed. In addition, two rigs formerly transferred to R.A.P. were acquired.

International

WORLD-WIDE OIL DEVELOPMENTS

The first exploratory test of the S.N.P.A. was drilled on the structure at Dreuilhe. A deep test started here by Pechelbronn was resumed at a depth of 1,070 m. (3,531 ft.) and continued without success to 2,056 m. (6,758 ft.). Another test, started in 1943, has now reached a depth of 1,600 m. (5,280 ft.).

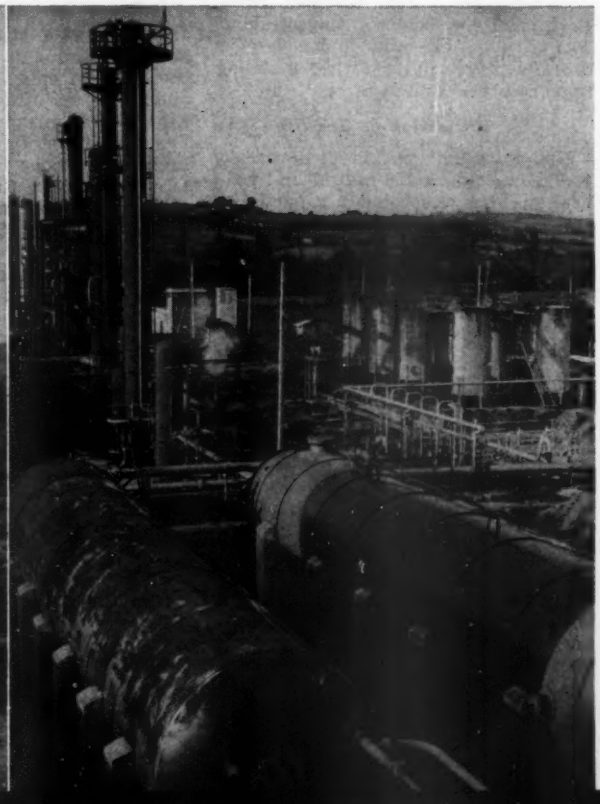
At Tresiers, two test wells are drilling, one at a depth of 1,071 m. (3,514 ft.), and the other at 1,250 m. (4,101 ft.). In addition, about 15 shallow tests have been around Tresiers, Cax and Auch, bringing the total drilling of S.N.P.A. since 1942 to about 5,900 m. (19,375 ft.).

S.N.P.L.M. Operations

The Societe National des Petroles du Languedoc Mediterranean (S.N.P.L.M.), founded in 1944, succeeded the Societe des Recherches Minieres et Industrielles which was organized in 1941 at the instigation and with the personnel of the Societe de Pechelbronn. At that time one rig for deep drilling and a smaller rig, capable of reaching depths of 1,500 m. (4,921 to 6,562 ft.) were placed at their disposal.

Present operations consist of a projected deep test at Gardiole, started in 1944 and now drilling at 725 m. (2,379 ft.), and a test well at Vaunage

Left: Scene in the region of St. Marcet, France. Petroleum is pumped into pipe lines leading to the refinery. Right: General view of the petroleum refinery in the region of St. Marcet. The refinery produces a large quantity of gas—enough to cover the domestic needs of the whole region. (Photographs courtesy French Press & Information Service)



which has reached a depth of 450 m. (1,476 ft.). Past operations of the S.N. P.L.M. have included several shallow wells at Gabian and Saint-Chinian.

Six wells in the Saint-Marcet field are now equipped for gas production and several of these have a capacity greater than 200,000 cu. m. (7,060,000 cu. ft.) daily. Only four of the wells are produced and only one of these is produced each day. The alternating of the producing wells serves as pressure-maintenance project. Rock pressures average about 170 kg. per sq. cm. (2,414 lb. per sq. in.) with shut-in pressures of about 140 kg. per sq. cm. (1,991 lb. per sq. in.) at the surface. A recycling plant is planned for the field in order to step up the production and still conserve the pressure.

The gas produced at Saint-Marcet is wet, and approximately 40 grams of distillate per cubic meter of gas (0.41 gal. per 1,000 cu. ft.) are recovered by the use of separators placed at the well head. Further treatment of the gas is carried out in an absorption plant recently constructed at Peyrousset by the Compagnie Francaise de Raffinage. Total yield from both the separators and the plant amounts to about 75 grams per cubic meter of gas (0.76 gal. per 1,000 cu. ft.) and ultimate yield is about 60 grams per cubic meter (0.61 gal. per 1,000 cu. ft.) of permanent product.

At present the daily output of gasoline by the Peyrousset plant is between 15,000 and 20,000 liters (3,963 and 5,284 gal.). The gasoline, however, has a low octane rating of about 50 and plans are now under way to order a tetraethyl treating installation from the United States.

Utilization of Gas

Dry gas from Peyrousset is carried to Toulouse by a 150-mm. (6 in.) natural gas line which has a capacity of 150,000 cu. m. (5,300,000 cu. ft.) daily with an initial pressure of 25 kg. (55 lb.). Here it is used in industrial boilers, in coking ovens, and is distributed as domestic fuel by Societe Lyonnaise des Eaux et Electricite. In the latter case it is diluted with manufactured gas in order to bring the caloric power down to about 4,000 calories. This practice has led to a saving of about 300 tons of coal a day at Toulouse.

Saint-Gaudens is also supplied with the dry gas by a 125-mm. (5 in.) natural gas line. Here it is distributed undiluted as a domestic fuel and the resulting saving in coal has led to the extension of the pipe line to Tarbes where the natural gas is greatly needed to supplement the supply of manufactured gas.

Production in South America Continues Expansion

BOGOTA.—Postwar production activities in South America show substantial increases. The following is a summary of wildcatting and development drilling in nine countries:

Colombia.—A total of 26 well sites are active here. Socony-Vacuum Oil Co., Inc., has six, three testing and three drilling. Richmond Petroleum Co. has two rigs running. Shell Oil Co., Inc., has seven active well sites, two in the Casabe field, two in the Dificil field, one each in San Angel, San Martin, Chafurray. The Texas Co. has one rig running in its fee tract. Tropical Oil Co. has five active well sites, four in the De Mares block and one outside. In the Barco, five well sites are active of which two are deep tests. Crude output in 1945 averaged 62,534 bbl. daily, compared with 62,040 bbl. in 1944.

Venezuela.—A total of 80 rigs are active in wildcat and development operations. Production in 1945 went as high as 1,000,000 bbl. daily, compared with 702,300 bbl. for 1944.

Ecuador.—Nine well sites are active. International Petroleum Co. has three rigs running. No. 1 Bajada was recently abandoned at 13,206 ft., which is one of South America's deepest wells; 2 Rodeo is drilling at 10,500 ft. and 1 Manta is drilling at 4,600 ft. Shell abandoned 1 Vauno at 5,280 ft. Two modern rotary rigs good for 8,000 to 10,000-ft. tests are slated to be flown to the Oriente (eastern flank of the Andes). Anglo-Ecuadorian Oilfields has four rigs and Ecuadorian Oilfields has two rotary rigs running. Output in 1945 was 6,850 bbl. daily.

Peru.—International Petroleum has 19 rotary rigs and eight cable tool strings running in its fee tract. Lobitos has 14 cable tool strings active and plans on installing two rotaries. El Oriente enterprise, sponsored by Peruvian promoters, will spud a test in the very near future in the Montana or eastern flank of the Andes area, some 300 miles northwest of Ganzo Azul field. The Peruvian Government has one rotary and three cable tool rigs in operation in Zorritos and has received one rotary to be installed at Santa Clara in the Montana area.

In the Titicaca national reserve area, near the Bolivian border, the government has one cable tool rig in operation. Some slight oil showings are reported. Total active sites in Peru total 46. Daily production in 1945 is reported at about 37,500 bbl., compared with 39,300 bbl. in 1944. A. A. Curtice, of Hoover, Curtice & Ruby, consulting geologists, has been retained by the Peruvian Government in the drafting of a workable oil law to promote development.

Bolivia — Yacimientos Petroliferos Fiscales Bolivianos (Bolivian Government Oil Fields) has five cable strings running and plans on five additional and two rotary in the Bermejo field. A 225-mile, 6,000-bbl. pipe line is to be built from the Camiri oil field to a location near Tintin. (The Oil & Gas Journal, March 9, 1946, p. 52). Output in 1945 is reported as 1,160 bbl. daily.

Chile.—The Chilean Government's wildcat in the Punta Arenas area, located through geological and geophysical work, cost of which is placed at over 30,000,000 Chilean pesos ($1,000,000) and drilled to about 7,500 ft., is reported to have shown a potential of about 8,000 bbl. daily of 39° A.P.I. oil. United Geophysical Co., under the direction of Glenn M. Ruby performed the technical work. J. K. Livermore Corp. is the drilling contractor. Up to 1917 some 10 core holes, ranging from 200 to 800 m. (654 to 2,624 ft.) were drilled in this area. From 1930 to 1932 drilling was undertaken by a Belgium firm for the Chilean Government. Up to 1942, seven wells, with a total footage of 25,600 ft. were drilled. The seismic work for the latest test started in April 1943 and covered some 10,000 sq. km. (3,861 sq. miles) in general and 2,500 sq. km. (965 sq. miles) in detail. The Livermore Corp. contracted the drilling of at least three wells.

Paraguay.—Union Oil Co. which leased the Gran Chaco for exploration has contracted with Drilling & Exploration Co. to drill a test. A rotary deep test rig is now on its way to location.

Argentina.—A total of 51 rigs are active. Yacimientos Petroliferos Fiscales (Government Oil Fields) has some 45 rigs in operation io Vespucio, Mendoza, Plaza Huincul, and Comodoro Rivadavia. Cia. Ferrocarrilera has three strings in the latter field and Astrea has one rig running. Decling activity of Standard Oil Co. (N. J.) as a result of the Government's policy towards outside major operators, is revealed in the fact that it has only three rigs running, one rotary in Tartagal, one cable and one rotary in Plaza Huincul fields. Daily production in 1945 was 62,000 bbl. compared with 66,200 bbl. in 1944.

Brazil.—The Government Petroleum Council has four rigs running in the Bahia area. Drilling is under contract with Drilling & Exploration Co.

Activity is summarized in the following table:

Country—	Colombia	Venezuela	Ecuador	Peru	Bolivia	Chile	Argentina	Brazil	Totals
Active sites	26	80	9	46	5	1	51	4	222
1945 bbl. daily	62,534	887,500	6,850	37,500	1,160	..	62,000	.	1,057,544

TO Pennsylvania's oil industry, America acknowledges a debt of gratitude. The Keystone state taught us to use petroleum and its products. "Drake's Folly" of 1859 led to the first "long distance" pipe line (5 miles of 2" pipe), the first trunk line (a 4" line from Oil Creek to Pittsburgh), and a trans-Allegheny line to carry this black gold to eastern markets. Until 1895 Pennsylvania ranked No. 1 in oil.

Today, in Pennsylvania's multitude of shallow wells there is strength. This state holds 12th place in production. Today its 83,230 wells are producing almost exactly at the state's 86-year average. Today its oil continues to make a major contribution to our national economy as it has for more than three-quarters of a century.

Pennsylvania expects to continue as an important oil producer for years to come. Through more than half its colorful oil history, Youngstown has served it with casing, tubing and line pipe. In the future, as in the past, oil operators, whether in Pennsylvania or any other part of the World, can continue to rely confidently on the dependable orange-banded pipe, drill pipe, casing, tubing and line pipe from Youngstown.

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Here are the newly elected officers of the Natural Gasoline Association of America. They are: J. B. Atkins, Parade Oil Co., Shreveport, vice president; C. R. Williams, The Chicago Corp., Corpus Christi, vice president; P. M. Raigorodsky, Glen Rose Gasoline Co., Houston, vice president; William F. Lowe, secretary; J. H. Dunn, Shamrock Oil & Gas Corp., Amarillo, president, and R. D. Gibbs, Union Oil Co. of California, Los Angeles, vice president

N.G.A.A. Told Industry Must Work Out Own Salvation

by Arch L. Foster

DALLAS. — That the natural-gasoline industry is faced with a changing economy and must meet the situation by working out its own salvation appeared to be the tenor of conviction of members attending the Silver Anniversary meeting of the Natural Gasoline Association of America here April 17-19. Keynoteing the meeting, N.G.A.A. President J. H. Dunn pointed out that the war has taught the industry that it has more to sell the refining industry than mere volatility. Balancing the total available supply of hydrocarbons is a new note in the economy of the two industries. During the war the production of light hydrocarbons, propane, butanes, and cycle stocks increased until in 1945 the production of all natural gasoline and related products amounted to 111,000,000 bbl., of which propane and butanes amounted to 47,000,000 bbl., or 42.5 per cent of the whole. Sales of liquefied petroleum gases increased seven-fold during the 9 years including 1945 and this outlet may serve to consume a good part of the production of these materials which were used during the war for military purposes but of which an oversupply is now available.

Outstanding among the sessions of the meeting was the "Information Please" session on Friday, April 19. With a panel of 14 expert engineers, economists, chemists, etc., a five-man screening committee to pass on questions which should be submitted to the panel, and with D. E. Buchanan, Hanlon-Buchanan, Inc., as interlocutor, a large number of the more important technical and economic problems of the industry were discussed by the members of the panel. M. H. Kotzebue, of Gasoline Plant Construction Co., outlined the problems of Office of Price Administration restrictions on material for new construction and showed the causes delaying much of the potential construction.

E. O. Bennett, engineering consultant, discussed the use of air instead of gas for repressuring, and mentioned advantages and disadvantages of its use. Asked what the effect of increasing catalytic cracking may have on the refiner's supply of light products and therefore its effect on the market for natural gasoline, H. B. Noll, Houdry Process Corp., pointed out that the use of catalytic cracking increases the amount of light materials—recovery gasoline — made in the refinery and thus potentially lessens the need for buying natural gasoline to control volatility. Natural-gasoline markets will be aided by the shortage of tetraethyl lead only if natural can be used to improve the octane rating of the finished gasoline and thus aid the refiner in meeting the octane-race demands. Many refiners may find it desirable to use synthetic instead of natural catalysts because of the small advantage of approximately two octane numbers which generally is obtained in the product by the use of the synthetic catalyst as compared to the natural or "clay" catalyst, it was stated.

R. P. Mase, chief engineer of the engineering division of Jones & Laughlin Supply Co., in reply to a question regarding ways and means of obtaining higher - vapor - pressure natural gasoline from old plants, recommended: (1) see that butanes are not going overhead from the stabilizer; (2) increase the rate of oil circulation to pick up more C_4s; (3) refrigerate both oil and gas, with propane or otherwise to increase the amount of light material dissolved by the oil. Explosions have occurred in a number of cases in compressed air lines used to start compressors. G. W. McCullough, Phillips Petroleum Co.,

New officers of the Natural Gasoline Supply Men's Association elected at last week's meeting are: William F. Lowe, secretary; John Heinzerling, Union Supply Co., vice president; F. J. Wetzel, Ingersoll Rand Co., president; Roy Bush, Nordstrom Division, Rockwell Manufacturing Co., vice president, and J. A. Knebel, J. A. Knebel & Co., treasurer

in discussing from the floor this phenomenon, stated that the only successful way to avoid these explosions is to prevent any trace of lubricating oil getting into the air lines. To avoid this difficulty lubricants such as soaps or other nonexplosive materials are being tested in service, McCullough stated.

Acetaldehyde, which can be made from ethane or ethylene from natural gas, is one of the most versatile of chemicals and is being used now for the production of more secondary products, probably than any other chemical compound, J. E. Bludworth, Celanese Corp. of America, stated in discussing "Chemicals from Lighter Hydrocarbons" before the meeting. By hydrogenation it can be used to make ethyl alcohol; by oxidation acetaldehyde yields acetic acid or acetic anhydride. These secondary products are converted to acetone and other ketones (such as methylethyl ketone) and also go into the making of large quantities of cellulose acetate, one of the well-known rayons. Ethyl alcohol can be converted to butadiene for synthetic rubber and large quantities were so utilized during the war. Acetaldehyde through the aldol reaction can be converted directly to butadiene. However, our total consumption of chemicals is too small to utilize any great portion of available light hydrocarbons.

The board of directors of the Natural Gasoline Supply Men's Association was increased to 15 members by adding three additional names: V. C. Canter, Jones & Laughlin Supply Co.; L. L. Dresser, Dresser Engineering Co., and J. A. Knebel, J. A. Knebel Co., all of Tulsa. Six directors were chosen in keeping with the former requirement of 12 members: Cade Clover, Westcott & Greis, Tulsa; Dallas Deem, American Air Filter Co., Tulsa; Warner Lewis, Warner Lewis Co., Tulsa; J. N. McClure, Elliott Co., Kansas City; Paul Wallack, Walco Engineering & Construction Co., Tulsa; Fred J. Wetzel, Ingersoll-Rand Co., Tulsa. Holdover directors are: Roy Bush, Nordstrom Valve Co.; L. S. Allen, National Tank Co.; L. D. McKay, Union Steam Pump Co.; John Heinzerling, Vinson Supply Co., and H. M. Rosevear, Wyatt Metal & Boiler Works, all of Tulsa. J. H. Dunn, president, The Shamrock Oil & Gas Corp., Amarillo, and president of N.G.A.A., is ex officio member.

Wide Range of Topics Covered By Equipment Suppliers

IN its first postwar meeting, marked by an attendance of more than 200, the Petroleum Equipment Suppliers Association covered an extensive agenda of topics in a series of meetings and interesting discussions.

The Tulsa meeting this week established a precedent in that it was the first time the annual meeting has not been held during either the American Petroleum Institute's annual meeting or during an oil exposition. However, the growth of the association and the complexity of postwar problems have become so great that problems of common interest to the members require more time than could be given under the old system. The new pattern of meeting will probably be continued.

The general theme seemed to be one of recognition of a need for greater cooperation in studying common problems, not only for the benefit of the association's members but also to achieve the most advantageous results for the petroleum industry which they serve. In a sense it was a "fact finding" convention, and two questions seemed to sum up most members' attitude: "Where are we going?" and "What common interests and problems do our association members have?"

Public Relations Stressed

Numerous individual members stressed the need for better public relations. They thought there ought to be a better and more widespread understanding within the petroleum industry of the problems of the association, which would result in greater appreciation of the services rendered in view of the handicaps overcome.

Tuesday morning was taken up with two general sessions. General accounting was the first subject, with John H. Lollar, Jr., Republic Supply Co., Houston, acting as chairman and leader of the discussion. Transportation or traffic was the topic of the second session with H. C. Witt, Jones & Laughlin Supply Co., Tulsa, in charge.

In the afternoon, Donald Brown, Bethlehem Supply Co., Tulsa, led a discussion of the knotty problem of sales taxes; after which personnel and labor relations came in for heavy discussion as a major postwar problem under the leadership of Thomas M. Mobley, Hughes Tool Co., Houston.

Wednesday morning there were two split sessions, with the suppliers and distributors' group under the chairmanship of A. B. Judd, Republic Supply Co., Houston, discussing problems peculiar to their special division of the association. The other session was held by the manufacturers' group, under the leadership of T. Sutter, Baker Oil Tools, Los Angeles, and the stress was entirely on manufacturers' problems. These morning sessions were followed by an afternoon meeting by the entire membership in which general problems were covered.

A board of directors meeting was held late Wednesday afternoon, with President Hugh H. Glen, Emsco Derrick & Equipment Co., Los Angeles, presiding. Following this, the members were entertained at Southern Hills Country Club by Tulsa members.

Hugh H. Glen, left, president of Emsco Derrick & Equipment Co., Los Angeles, is president of the Petroleum Equipment Suppliers Association, and A. B. Judd, of Republic Supply Co., Houston (right), is vice president

WASHINGTON WATCHING

BY HENRY D. RALPH

Amendments Would End Oil-Price Controls

WASHINGTON.—The end of oil price controls within a couple of months is virtually assured by the amendments to the OPA extension bill which the House voted by large majorities last week.

The Senate may throw out some of these amendments or tone them down and the final result will be a compromise between the two versions, but at the moment Senate sentiment seems strong for putting severe limitations on OPA's remaining powers.

Of most direct effect on the oil industry is the Gossett decontrol amendment. This provides that any industry advisory committee shall certify what commodities in its industry have been produced during the preceding 12 months at a volume greater than during the period between July 1, 1940 and June 30, 1941, and OPA must remove all price controls from such commodities within 10 days.

This is more certain and specific than the Brown amendment which was approved by the House banking and currency committee and endorsed by OPA, providing for decontrol on certification by the President that production of a commodity equals domestic demand.

The OPA and other administration spokesmen will fight this amendment on the ground that the legislative formula is too specific and that more administrative discretion should be permitted in decontrol, but most of the opposition will be centered on other provisions inserted by the House. One of these is the Wolcott-Andresen amendment on cost-plus pricing, which provides that every ceiling on each individual commodity at all stages of production and distribution must be high enough to cover costs plus a reasonable profit. The opponents have called this a "profit guarantee" provision, but more valid objections are that it would impose a stupendous accounting job and would require high ceilings on by-products traditionally sold below their individual production costs.

The Senate banking and currency committee is now holding hearings on the House measure, and oil industry representatives were expected to be given time to testify this week. The committee is expected to make many modifications in the House measure but probably will retain at least the principle of the Gossett decontrol provision. However, when the bill reaches the Senate floor it probably will be rewritten again. For instance, Senator Thomas of Oklahoma has announced his intention of offering an amendment to exempt from price control many specific commodities including petroleum, lumber, minerals and farm products.

Meanwhile OPA is going along with its previously announced intention of working out a program to suspend oil price controls within 6 months. The crude oil and refining industry advisory committees have been called to meet with OPA officials in Chicago May 3 to discuss standards for an orderly and progressive decontrol program. OPA's idea is to suspend ceilings on one oil product at a time and see what happens; if the price goes up significantly the ceiling would be slapped back on.

Director John W. Snyder of the Office of War Mobilization and Reconversion got interested in this oil decontrol program to the extent of hoping to speed it up, but in view of the apparent disposition of Congress to require complete elimination of controls on oil and many other commodities he probably will not do anything at this time. A couple of weeks ago it appeared that it might be a wise political move to lift controls from a few commodities to demonstrate to Congress that the administration could be trusted if decontrol were left to its discretion, but in view of the present legislative situation such action would only whet the appetites of OPA's congressional opponents.

Tidelands Resolution Due for Early Report

THE tidelands resolution renouncing federal claims to off-shore oil deposits probably will be reported favorably to the Senate shortly. At its last regular meeting the Senate judiciary committee voted five to four in favor of the resolution but the matter will be left open a few days to see if the nine absent committeemen show up and express themselves.

This probability was enhanced last week with disclosure that at least some of the opposition was inspired by interests who have been peddling stock in concerns that hope to get federal leases to California tidelands if state control is voided.

Presumably as a result of these disclosures Senator Capehart of Indiana withdrew two resolutions he had pending in the Senate, one to prevent consideration of the subject until the Supreme Court has decided the issue and the other to direct the Secretary of the Interior to issue certain drilling permits off the California coast. Capehart made no explanation of his move, but it is known that former Senator Watson of Indiana is now attorney for certain parties seeking federal leases for tidelands oil development.

A few days later Watson issued a denial of published charges that he had been given stock in a venture known as the Pacific Underseas Oil Co. Some newspapers charged that this concern is engaged in a stock-selling campaign and is one of the chief advocates of the claim that the federal government rather than the states has title to submerged oil lands.

Davies Staging Fight for Dissolution of PAW

A FIGHT to be fired is currently being waged by Deputy Petroleum Administrator Ralph K. Davies. Months ago he recommended that PAW be formally dissolved on April 30, and he and his dwindling staff have been planning accordingly. But the President failed to issue the necessary order.

But the idea of completely wiping off an emergency agency which had done such good work during the war was a bit hard for some administration insiders to take. They just hated to see any government powers surrendered, and a move developed to continue PAW in some form or other, if only on paper, just in case. The move didn't originate with the new Secretary of the Interior, J. A. Krug, for when he was head of WPB on V-J Day he dropped controls so fast it made the New Dealers shudder. Nor did it originate with Reconversion Director Snyder, though he has been somewhat on the fence.

A couple of months ago something could have been made out for continuing PAW because of the fuel oil shortage and the Navy's difficulties in getting the quantity and the quality of products it needed. A good many people in the administration wanted PAW to reinstitute the directives which forced refiners to make specific products during the war. Davies stoutly re-

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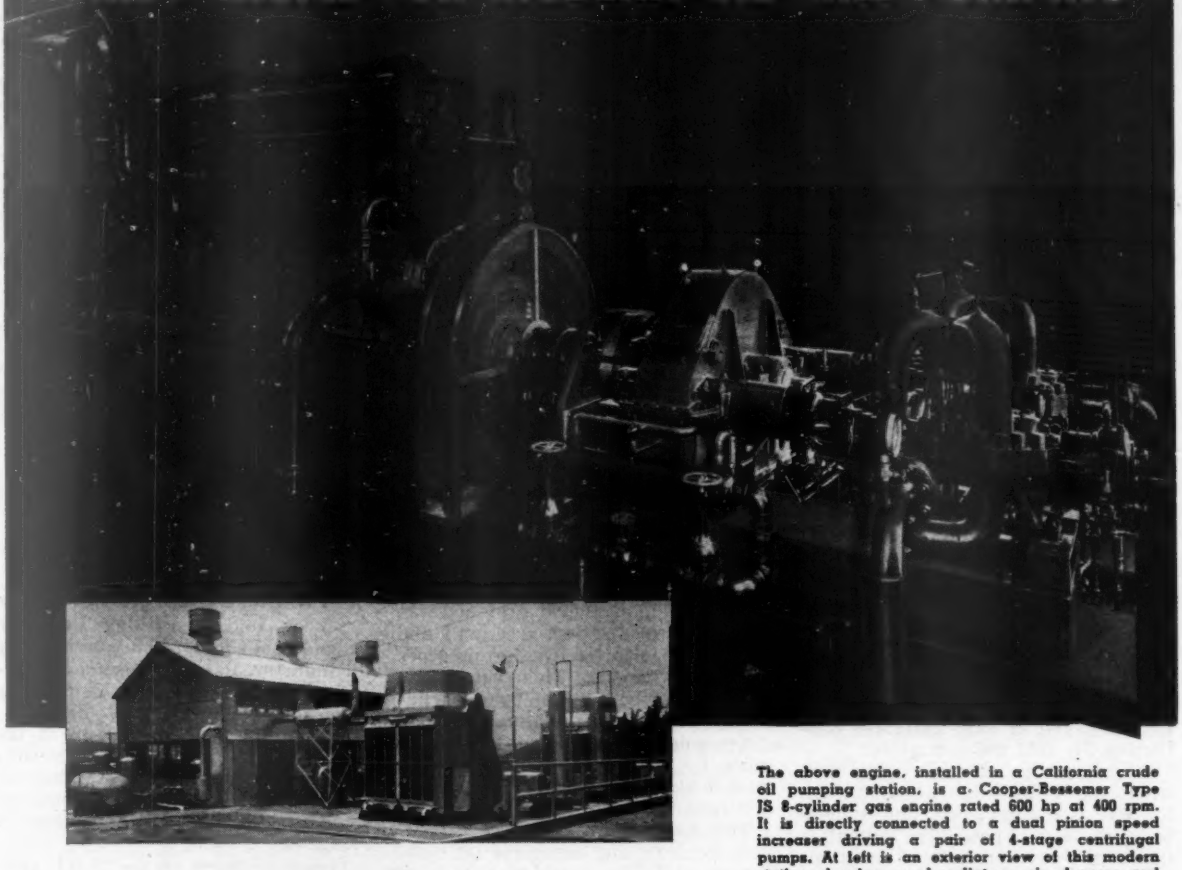

The above engine, installed in a California crude oil pumping station, is a Cooper-Bessemer Type JS 8-cylinder gas engine rated 600 hp at 400 rpm. It is directly connected to a dual pinion speed increaser driving a pair of 4-stage centrifugal pumps. At left is an exterior view of this modern station showing quad radiators, air cleaners and other auxiliary equipment.

The modern installation pictured here, on a major oil company's crude line from Ventura to Los Angeles basin, is perhaps unique on the west coast. Here a Cooper-Bessemer Type JS gas engine is driving a pair of 4-stage centrifugal oil pumps through a dual pinion speed increaser. This rugged engine will give efficient, economical service for years to come and with a very minimum of down-time.

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sisted, saying that the answer lay not in more controls but in fewer—elimination of price ceilings. It was also reported that OPA wanted PAW continued to give it advice on petroleum matters—which is downright funny considering how little attention OPA has ever paid to PAW's advice.

By now Davis has dissolved all his industry advisory committees and his staff is down to a mere score who have until the end of the fiscal year (June 30) to finish writing the history, tidy up the files, and inventory the office equipment.

During the last few days Davies has put up a stiff fight within the Government to have PAW liquidated on schedule, and now feels that the necessary order will be issued. If so, he will remain in Washington a while to finish winding up a few pending matters; if not, he and his remaining assistants will pull out next week and PAW will be liquidated in fact if not legally.

Retention of Coordinating Function of PAW Urged

WHILE fighting for liquidation of the wartime controls exercised by PAW, Davies is still of the opinion that the coordinating function of PAW should be continued.

In his swan song before the House petroleum subcommittee last week Davies said that when he came to Washington in 1941 he found 27 different agencies of the executive branch of the government dealing with some phase of petroleum activities, with their activities unrelated, confused, and in some instances conflicting. He told the committee:

"It is just as obvious today that, when the Petroleum Administration for War is extinguished, unless there be some better peacetime organization of the government's oil functions in terms that will continue something comparable to the centralization we have known during the war, we will go back to the unsatisfactory condition of 1941. Already, as we are liquidating PAW, this disintegration can be observed, with its damaging effects only too discernible. The confused and ineffective efforts that are currently being made in certain governmental quarters to deal with phases of present-day oil problems provide all that is needed in the way of illustration.

"But I do recognize quite clearly the need for improved organization in the federal government as applied to its oil functions, and I do advocate centralization of oil and gas activities in a single office to the fullest extent that it is practical. There are limits beyond which it would not be feasible to go in the actual transfer of functions to a central office, but the result as applied to such separated functions would still be had, if the central office is recognized as the coordinating unit and the liaison with the oil industry.

"It will be a great pity, I think, if, growing out of our wartime experience, there does not evolve an improved organizational arrangement within the federal government and an effective relationship between the government and the petroleum industry. The experience on both sides over the past 5 years ought to have taught some lessons of worthwhile application looking to the future. I hope that those responsible in government will not fail to recognize the opportunity to do a better piece of work in the days ahead. And I hope that the oil industry will recognize in this their best assurance of continued independence and their best protection against governmental encroachment."

New Iranian Ambassador Faces Difficult Task

OUR new ambassador to Iran, George V. Allen, is hurrying to his post to relieve the ailing former Ambassador Wallace Murray, and he will have a big job on his hands when he arrives, to judge by the reports which have been coming out through the new Iranian censorship.

The U. S. State Department has no objection to the recently announced Russian-Iranian oil deal provided Iran entered it of its own free will and was not pressured by the presence of Soviet troops. This agreement, which must be ratified by a parliament yet to be elected, calls for oil development in northern Iran provinces by joint stock company controlled 51 per cent by Russia and 49 per cent by Iran.

This may or may not be good business for Iran, and American oil companies probably would not care to enter similar contracts for development of other Iranian regions. The State Department takes the position that Iran as a sovereign state can develop its oil resources in any way it pleases or not develop them at all, but that Iran will be expected to live up to the terms of any concessions or contracts made with Americans in the past or future.

The Russian oil deal, if carried out and confined to northern Iran, will not conflict with any American or British oil activities in the Middle East. Considerable is known about the geology of the region, and it is believed that the only areas likely to show much oil lie very close to the Caspian Sea. This means that the only practical market is Russia, since formidable mountain ranges shut off this region from the Persian Gulf or the Mediterranean.

Press dispatches say that the Iranian government is considering offering to negotiate with British and American interests to explore for oil in other areas of the country. State Department officials doubt that American interests would care to be minority stockholders in an Iranian government corporation, but they consider this to be purely a matter of private judgement and no concern of our government so long as terms are freely arrived at and contracts are respected.

Still another complication is the report that Iran has decided that Bahrein Island is part of Iran and that oil produced there will be taxed on the same basis as oil produced on the mainland. Bahrein broke loose from Persia before the turn of the century and its independent sheikhdom has been under the protection of Great Britain, but its entire oil production is by subsidiaries of American companies—The Texas Co. and Standard Oil Co. of California.

Ambassador Allen is only 42 years of age. He entered the foreign service in 1930 and from the first has specialized in Near East affairs. Recently he has been deputy director of the State Department's Office of Near Eastern Affairs.

Lea Committee Gets Last Of Industry Testimony

APPARENTLY Congress has now been told everything that can be said about the present status of the oil industry, its prospects for the future, and the proper elements of a government petroleum policy. At least nothing new turned up at the hearings of the House petroleum subcommittee last week, described by Chairman Lea as simply to complete the committee's record of wartime oil activities.

President Boyd of the A.P.I. contented himself with inserting in the record the national oil policy resolutions of the late Petroleum Industry War Council and the summary testimony presented a month ago to the Senate petroleum resources committee by A. Jacobsen as spokesman for the industry.

Retiring Deputy Petroleum Administrator Davies briefly summarized current conditions and trends, repeating previous recommendations for a strong American oil industry, incentives to exploration, the need for building up reserves and productive capacity, and support of foreign oil ventures.

Other former PAW officials gave highly condensed oral reports on their wartime stewardship and the condition of various branches of the industry as turned back by the government. No significant questions were asked by the committee.

Price Decontrol Delayed For Oil Equipment Groups

WASHINGTON.—Further developments in the Office of Price Administration's announced plan to remove price control from oil field equipment can be expected about May 6, according to Rep. Albert Thomas of Texas.

Reports were current here several weeks ago that decontrol for the equipment end of the oil industry was imminent. Representative Thomas, who has been pressing for the action, said removal of the controls has been unaccountably delayed.

John M. Buckley, deputy administrator of OPA, said the entire field of industrial equipment is being surveyed for possible inclusion in OPA's next ceiling suspension list due between May 6 and 10.

Meanwhile, Brad Mills, executive vice president of the American Association of Oilwell Drilling Contractors, pointed out in an organizational bulletin that the weighted average of price increases already placed in effect or scheduled on various drilling equipment items probably will not exceed 15 per cent. Increased prices on many bulky items will be less than on lighter items which require more machining and workmanship, he said. He added many prices have not yet been agreed on by manufacturers.

State of Texas Enters First Unitization Plan

AUSTIN, Tex.—The State of Texas has entered into a unitization agreement with operators in the Carthage field of Panola County, marking the first time the state has participated in such an arrangement.

Under the pooling agreement, the Sabine River tract, on which the school land board recently awarded a mineral lease, will be unitized with adjoining acreage. The state will receive one-eighth royalty on the gross revenues from all products from the processing plant. Glassell & Glassell, Shreveport firm, leased the Sabine River tract from the state, paying a bonus of $129,375.

Correction

In the March 30, 1946, Annual Refinery Number, page 149, under "Hydroforming," the expression, first paragraph, "Yields 80 per cent or more of hydrogen polymer," the last word should be "product" instead of "polymer." A product referred to as polymer is formed in this process but is a byproduct, not the main product of the reaction.

On page 141 of the same issue, under Fluid catalytic cracking, The M. W. Kellogg Co. was inadvertently omitted from list of licensors of process. The M. W. Kellogg Co. were pioneers in developing the Fluid catalytic-cracking process, and have erected more than 70 per cent of the Fluid cat-cracking capacity of the world.

DEATHS

Wirt D. Rial, 70, asphalt sales executive for Petrol Corp., died April 15 in Wilmington, Calif. Considered an authority on refinery construction and operation, Rial formerly was associated with Standard Oil Co. (Ind.), and later with Standard Oil Co. of California. He formerly operated an asphalt producing company in Long Beach, Calif.

Sam N. Bumpass, 49, production engineer of Lone Star Gas Co. who had been associated with the company for 20 years, died April 20 in Eastland, Tex.

Richard Nelson Bradley, 67, oil producer of Petrolia, Ont., died recently.

Edward B. Mott, 66, driller and oil producer, died recently at Copleston, Ont. He drilled the deepest well in the Petrolia field, and also had supervised drilling operations in Venezuela, Newfoundland, and western Canada.

F. W. Fraley, Sr., 73, well-known Gulf Coast oil executive, died April 19 in Houston. He entered the oil industry in 1904 when he joined Waters-Pierce Oil Co. He later became vice president of Mexican Sinclair Petroleum Corp., and vice president of Sinclair Refining Co. of Louisiana. From 1930 until his retirement a year ago, he was in charge of local retail sales in the Houston area for Sinclair Consolidated Oil Co.

Henry O. Forrest, assistant vice president of M. W. Kellogg Co. and former director of research at Massachusetts Institute of Technology, died April 15 in Teaneck, N. J. Forrest held patents on several oil processes.

J. L. Heckerd, dispatcher for Shell Pipe Line Co., died April 15 in Colorado City, Tex.

William S. Gumbert, 80, retired sales manager for Sun Oil Co., died April 13 in Pittsburgh.

Michael L. Bartlett, 65, an officer of Royal Oil & Gas Co., died April 12 in Tulsa.

Frank B. Hengst, 48, president of Mid-Continent Torpedo Co. and a widely-known oil well fire fighter, died March 12 in Tulsa.

Thomas Iles, 52, after whom the Iles field in Moffat County, Colorado, was named, died in Craig, Colo. He was president of the Moffat Tunnel Commission and the Comet Motor Express Co., which operates between Denver and Salt Lake City.

Harry W. Wilson, 66, Pasadena, Calif., who held interests in East Texas oil fields, died April 18 in Henderson, Texas.

C. E. Rentchler, 74, veteran employe of Oklahoma Gas & Electric Co. and general manager of the Drumright, Okla., plant until his retirement in 1938, died April 21, in Cushing, Okla.

This group participated in the "hearing" on duties and responsibilities of the engineer in the oil industry at a joint meeting of the North Texas and East Texas sections, A.I.M.E., and the Petroleum Engineers Club of Dallas. A brief account of this meeting appears on page 121 of this issue. Shown here are: front row, K. M. Fagin, petroleum engineer, Dallas, chairman of the program committee; L. T. Potter, Lone Star Gas Co., interlocutor; Warren J. Jackson, Lane-Wells Co., president, Petroleum Engineers Club of Dallas; Bowman Thomas, Humble Oil & Refining Co.; Norman L. Dorn, chief engineer and vice president, Lane-Wells Co. Rear row: H. Dotterweich, head of the department of engineering, Texas College of Arts and Industries; William D. Owsley, chief engineer, Halliburton Oil Well Cementing Co.; Roger Henquet, general manager, Schlumberger Well Surveying Corp.; and W. A. Alexander, manager, Shell Oil Co., Inc., Houston

Submarine

by R. P. Howell

LAST summer Standard Oil Co. of California replaced the submarine loading line used at its El Segundo refinery for tanker shipments of gasoline and light oils. The materials selected and construction practices employed are believed to offer several unusual features of interest.

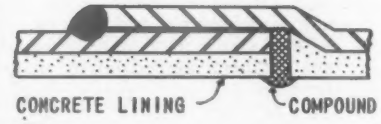
El Segundo refinery is located on Santa Monica Bay south of Los Angeles. It is the terminus of a number of crude-oil and product pipe lines in the Los Angeles area and is provided with two submarine line systems for receiving crude oils and stocks by tanker and for offshore product shipments. During the war millions of barrels of 100-octane gasoline and other petroleum products used in the Pacific were delivered to tankers through these lines.

History

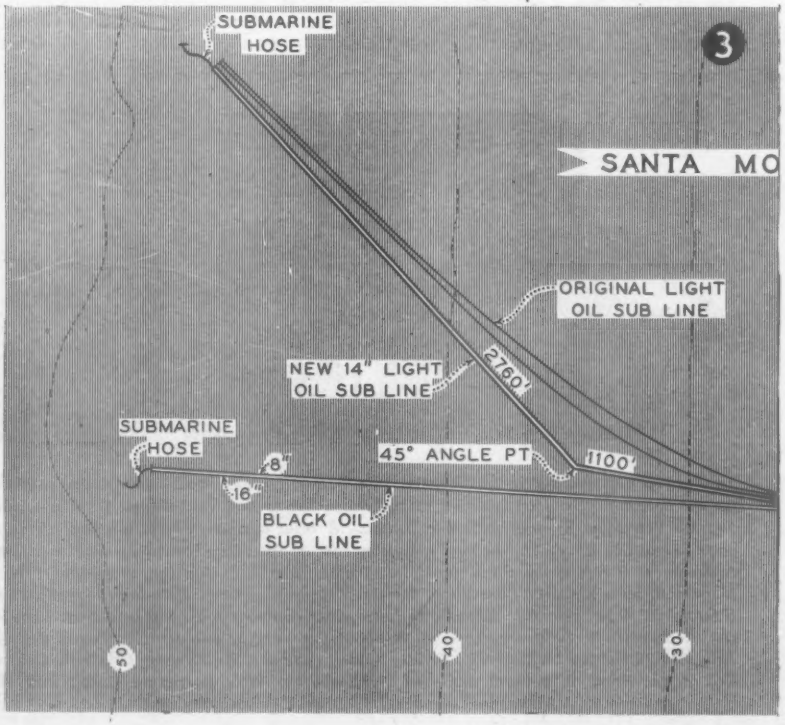
The original light-oil submarine line was laid in 1934 of ½-in. wall, 13⅜-in. o.d. well casing. It consisted of two parallel sections, each approximately 3,700 ft. long, extending in a loop from the refinery wharf to a submarine hose at the tanker moorings approximately a mile offshore. No measures to prevent corrosion were taken initially, but cathodic protection was applied in 1938 to arrest severe external corrosion which threatened to limit the life of the line to a relatively few years.

Although cathodic protection appeared to have completely stopped external corrosion, there was no control of internal corrosion. As a result, when leaks from internal corrosion began to occur in gasoline loading lines on shore, it appeared probable that similar corrosion was taking place in the underwater sections. An inspection of the submarine lines was therefore made in the summer of 1944.

For the inspection a diver equipped with air tools drilled holes through the pipe at a number of points along the line. He determined the depth and type of pitting and the remaining metal thickness with special measuring devices designed by the engineer in charge. These instruments included a collapsible depth gage inserted through the hole in the pipe wall and a large caliper used to measure the actual pipe-wall thickness



2 TYPICAL JOINT DETAIL CONCRETE - LINED PIPE



LOADING-LINE

Replacement

Fig. 1—Delivering 14-in. concrete-lined pipe to welding platform on small flatcars, where they are rolled on the ways in proper position

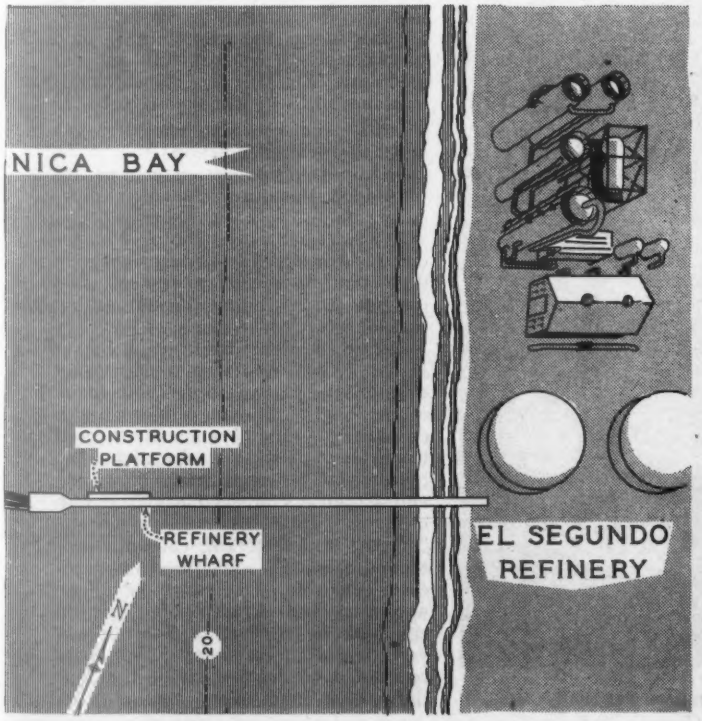
Fig. 2—Detail of joint used for expanded-end concrete-lined pipe. The pipe was filled with water during welding to keep lining cool

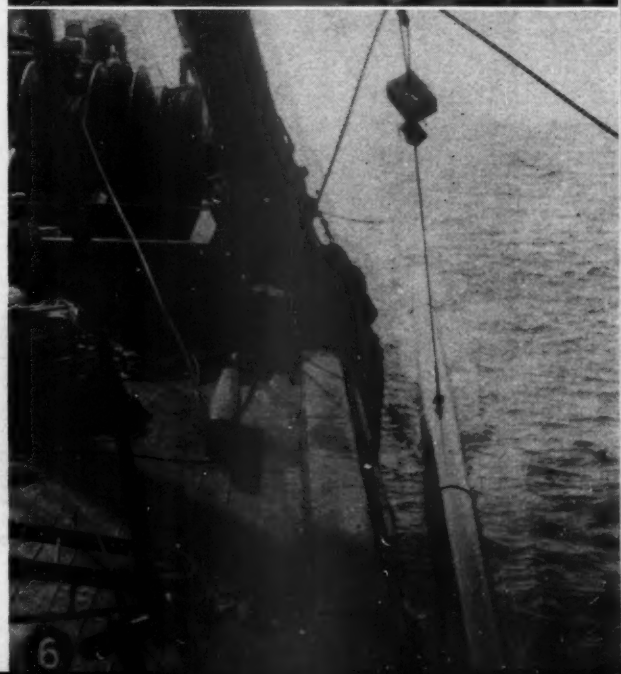
Fig. 3—Location of the El Segundo submarine lines. Route of the light-oil line was chosen to avoid an anchorage area near the wharf

Fig. 4—Temporary plate closure used during launching and placing operations. Closures were removed by diver when section was on the bottom ready for bolting up

Fig. 5—Launching fabricated pipe section. After being welded on the platform, the 270-ft. piece was rolled into the water 30 ft. below

Fig. 6—Pipe section held by derrick barge ready for lowering into place and bolting up by diver. The flange ends are closed to maintain buoyancy





opposite the hole. After the inspection at each point, the diver tapped and plugged the hole.

At each point the same condition was encountered: continuous chain pitting had occurred at the bottom along the entire length, with less than 20 per cent of the original wall thickness remaining in some pits. Very little pitting was found except at the bottom of the pipe.

Concentrated corrosion of this type is often encountered in gasoline lines, especially when water (in this case sea water) has been used for occasional displacing or testing. Where this condition has been found in other lines, as at Estero Terminal, California, it has been possible to rotate the pipe a quarter or half-turn and leave it in service. At El Segundo, however, this expedient did not appear feasible. It would have been difficult and expensive to rotate the long line, and leaks might still have occurred from normal corrosion of thin areas. Replacement was therefore authorized for the summer of 1945, this being the earliest that materials were available.

Materials

The most important problem in materials selection was to minimize the effect of internal corrosion. As cathodic protection cannot feasibly be used to protect the inside of a pipe, some type of lining appeared to offer the most promise. Concrete-lined ("Duroline") pipe was chosen because this material has performed satisfactorily in salt water service. With this lining and the elimination of external corrosion by cathodic protection, the pipe weight could be only the minimum needed to prevent the line from floating when displaced with air. This requirement was met by 14-in. o.d., ⅜-in. wall pipe with a ⅜-in. lining, weighing 73 lb. per ft. including the lining, or about 4 lb. per ft. empty in sea water.

Most of the pipe was obtained with expanded-end ("bell-and-spigot") joints in 30-ft. lengths. This type of joint (Fig. 2) uses a fillet weld on the pipe several inches from the end, away from direct contact with the lining. The concrete extends only to the shoulder of the bell, making the lining continuous except for a small space at each joint which is filled with a special sealing compound. Connections at the construction sections were made with 300-lb. slip-on flanges.

Electrical measurements of the existing cathodic protection system had disclosed considerable "short-circuiting" of current through the water between suspended anodes and the bare pipe risers at the end of the wharf. This condition might have been corrected by rearrangement of the cathodic system, but anode locations were limited and it was decided to reduce the current pickup in this section by covering the risers and first 300 ft. of each section with Somastic* pipe coating.

Consideration was given to several alternate construction methods. When the original light-oil line was laid in 1934 it had been welded in strings on the wharf trestle and pulled into place by an anchored derrick barge. It had been necessary to follow a curved path to clear an anchorage area for small vessels mooring at the wharf, and as a result considerable difficulty was encountered in keeping the two loop sections properly separated and in selecting correct locations for the marine equipment at successive pulls.

*"Somastic" is a registered trade-mark of Standard Oil Co. of California.

R. P. Howell, author of this article, joined Standard Oil Co. of California engineering department in 1936, following 2 years with the U. S. Army Engineers on the construction of Bonneville Dam. His principal activities have been power-plant and utilities-system engineering and pipe-line design and construction. Recently he has specialized on pipe-line soil-corrosion problems and on the application of cathodic protection to pipe lines and submarine lines. On the El Segundo construction he assisted F. G. Hampton, who was in charge of the project. Howell is a graduate mechanical engineer from University of Washington.

To avoid a repetition of these difficulties and prevent conflict between the various lines, it was decided to lay the new line in flanged sections of manageable length, each made up on the wharf and floated into final position for bolting up by a diver. By this means the loop could be laid in two straight courses with one angle point (Fig. 3). The principal advantages of this construction were:

1. The line could be placed in exactly the desired position.
2. Any flanged section can be replaced in the future without difficulty.
3. It was not necessary to take special precautions to prevent excessive deflection of the pipe and possible damage to the lining during pulling and launching operations.

Before the exact route could be selected, it was desirable to locate accurately the existing lines (both black oil and light oil), which were under considerable sand cover. A diver could have been used to probe along the bottom, but it was felt that both time and expense could be saved by an electronic device operating from the "ripple" signal of the cathodic protection rectifiers. The assembled locator consisted of a Pearson geophone amplifier and waterproofed pickup coil with 75 ft. of cable. For the survey the rectifiers were temporarily connected to drain each of the four lines at a time. With the amplifier

Fig. 7—Derrick barge lifting Somastic-coated pipe section from welding platform

carried in a small boat, the weighted coil was dragged along the bottom until the instrument indicated that the coil was over the line. The boat was then stopped and brought back until a stadia rod could be held directly over the coil and the point "shot in" with a transit from the wharf. A number of points on each line were found and plotted by this means in less than a day.

Fabricating Sections

The area available for construction operations was quite restricted. For fabrication of the sections an overhanging platform was built at the seaward end of the wharf trestle adjacent to the service railroad. The available space limited the platform length to 300 ft. and also prevented the use of mechanical pipe-handling equipment. Welding ways were placed on the platform over each pile bent and carefully leveled and aligned to facilitate launching. At each end a 1,000-lb. utility air hoist was installed to control the pipe sections in the water.

Pipe was delivered to the platform on small flatcars and the joints rolled on the ways in their proper positions (Fig. 1). Eight 30-ft. lengths of expanded-end pipe and one 20-ft. plain-end piece made up a section to which the slip-on flanges could be attached without removing a pipe bell. As the construction schedule required delivery of two sections a day, working conditions were crowded. Three sections were usually on the ways at a time, one completely welded and being prepared for launching, one on which the welders were working, and one being delivered and lined up for welding.

Welding currents ordinarily used for pipe required internal cooling of the lining to prevent overheating and cracking of the concrete. For the first sections a water spray was used for cooling, but it was found that considerable welding time was lost during moving of the sprays and hose and in fitting up the individual joints. Thereafter, before any water was used the pipe was lined up and tack welded, and light stringer beads were laid at each joint and at the two flanges. The entire section was then filled with water by use of temporary plugs. Several welders could then work on the section and complete all welds without interruption and without hazard to the lining. Inspection showed that the dry stringer welds did not provide enough heat to affect the lining.

Launching

When welding on a section was completed the cooling water was drained out and a "squeegee" scraper blown through with compressed air. The scraper cleaned excess sealing compound from the joints and removed small amounts of water that remained in the pipe and might have caused instability during launching and placing operations.

After the scraper had been run the section was made ready for launching. The flanged ends were sealed with plate closures (Fig. 4) held in place with cap screws from the back of the flange. The flush ends of these closures were designed to permit placing the section in a close fit-up position before the plate was removed. To assist the marine crew in their operations, two lifting eyes were attached and a connection was made for the "messenger" wire to be used in guiding the section into place. Tow lines were also attached at each end.

The two daily "launchings" were spectacular events. When the section was ready, cables from the two air hoists were lowered to the bottom in loops deadended at the platform. The pipe was lined up on the ways against retaining dogs and held with two blocks while pins in all the dogs were removed and the equipment checked. Then, at a signal from the engineer in charge, the blocks were removed. The long section rolled freely off the ways into the water 30 ft. below, cutting a V-shaped trough and sending curtains of spray into the air (Fig. 5). After the initial impact with the water, the section lost velocity rapidly and settled slowly to the bottom to rest in the cable loops.

This launching method naturally gave rise to some apprehension that the concrete might be damaged. Actually, the pipe landed evenly in the water and was subjected to less shock than could occur in normal handling. It was necessary, of course, to perform the operation carefully and prevent an uneven fall by insuring that all parts of the section cleared the ways at the same instant.

Placing Operations

After the section had reached bottom, it was raised with the air hoists almost to the water surface. Three 1,000-lb.-capacity lifting buoys were then attached while only the submerged weight of the pipe was held by the light hoists and rigging. Each buoy was fastened by a cable sling, one end of which was permanently shackled to the buoy and the other passed around the suspended pipe and up through a center pipe in the buoy to a pin at the top. The buoy could thus be released during placing operations by pulling the pin. When the buoys were in place, the lifting cables were cast off and the section moored ready to be towed out and placed.

The marine contractor employed a 25-ton derrick barge to place the pipe and a small tug to maneuver the barge and tow the sections out from the wharf. Two divers with their tenders and equipment were included in the barge crew.

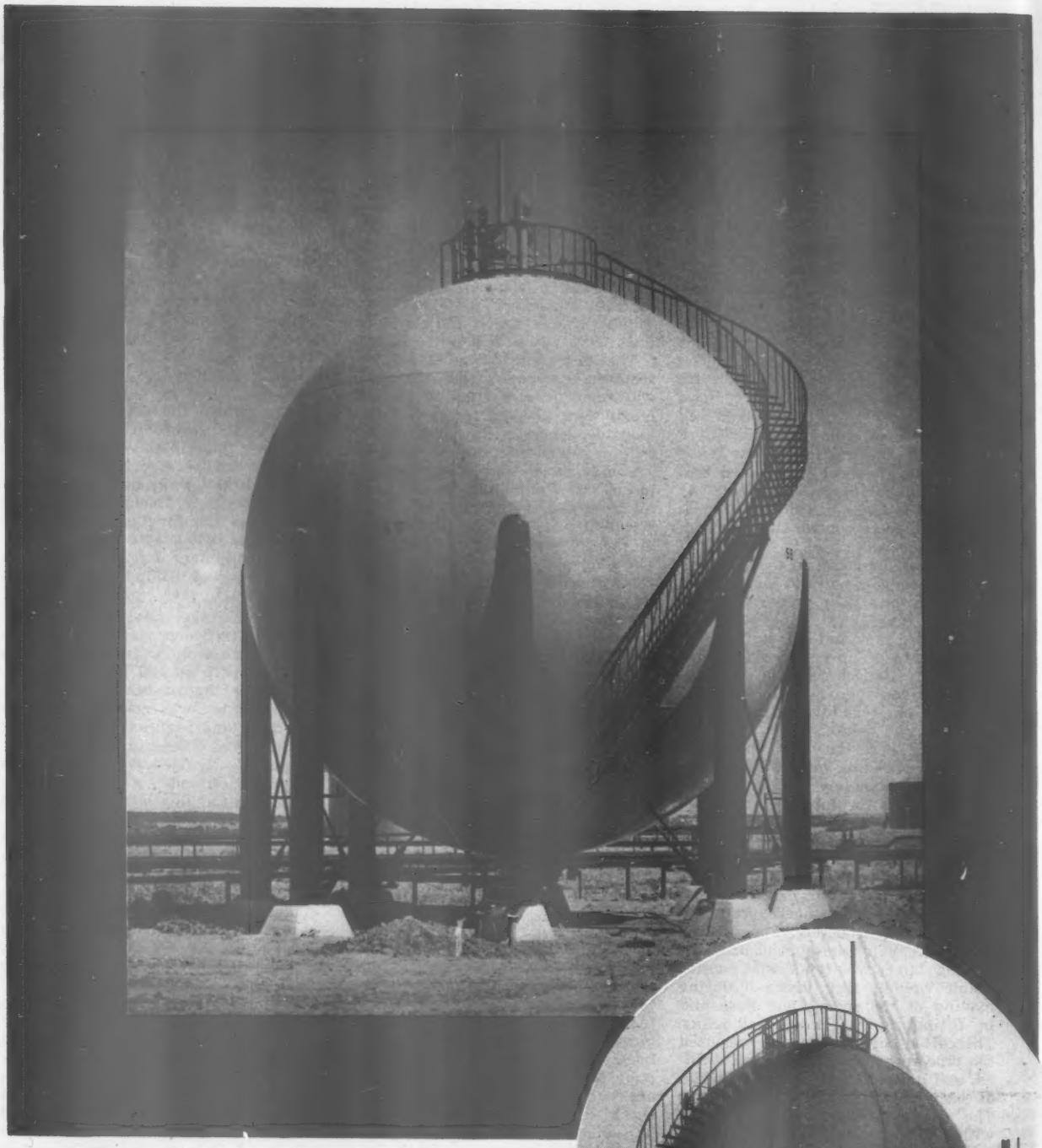
When the barge was anchored "on line" in the proper position the tug towed out the flanged and buoyed section and brought it alongside. The weight was then transferred to the barge with the lifting slings so that the buoys could be released (Fig. 6). Care was taken not to lift the pipe free of the water and risk damage to the lining from excessive deflection of the overhanging ends. With the section suspended from the barge, and a diver on the bottom, a "messenger cable" was passed through the top flange hole of the section already in place and through the corresponding hole of the new section. The barge then lowered the section as directed by the diver and guided it into position with the messenger cable. The pipe could be handled easily because of its buoyancy. When the section was properly placed and the flange pinned the diver slipped out the plate closure, letting in the water, and then bolted up the flange with an air-operated impact wrench. Although the contractor utilized his derrick barge in placing the line, this method of handling pipe in sections would be well adapted to less elaborate equipment employing only a combination of lifting buoys and light rigging on surface craft.

At the tanker moorings the two sides of the loop were joined in a hose Y-connection fabricated from welding fittings and then concrete-lined. For the fit up of one side a wood dummy was made in place by the diver and used as a template for the final short section. Van Stone (loose-ring) flanges were used at the Y-connection and at the angle points to permit flanging without regard to bolt hole positions.

The risers and coated sections at the end of the wharf were lifted directly off the welding ways and set in place by the derrick barge (Fig. 7). A split casing was bolted over the risers to protect the coating from damage by floating objects.

An especially careful hydrostatic test of the line was desired because of the many flanged joints. After a first unsuccessful test the line was unwatered with compressed air and two leaking flanges revealed by bubbles at the surface. When these joints had been tightened by the diver a final stand-up test of 450 psi. was held without difficulty. After the test the 200 ft. of 10-in. submarine hose was inspected and moved to the new Y-connection and the necessary wharf piping changes were made.

F. G. Hampton was in charge of designs and construction for Standard of California. Pacific Pipeline Construction Co. welded the sections and performed other work on shore. Hull, Smale, & Robinson, Inc., performed the marine work. The cooperative efforts of these two contractors were an important factor in successful completion of the job within the scheduled time and with a minimum of interference to normal operations.



• *The HORTONSPHERE shown above is used to store butane at 85 lbs. per sq. in. pressure. It is 38 ft. in diam. and was designed according to API-ASME Specifications.*

• *The group of Hortonspheres shown at the right is used to store volatile products at a refinery in California. They are 31 ft. in diam. and are designed for a working pressure of 75 lbs. per sq. in. pressure.*

HORTONSPHERES

ARE BUILT BY CHICAGO BRIDGE & IRON COMPANY

ELECTRIFICATION

Of Smackover Wells Lowers Lifting Costs 36 Per Cent

by George Weber

The old Smackover field is now one of the "big" electrified pumping operations in the country. Smackover wells are in the "heavy water production — stripper class," with many of them making about 95 per cent water. Pumping costs had been equal to a large proportion of total revenue. Electrified pumping units have yielded substantial savings.

ELECTRIFICATION of a large group of wells, coupled with equipment modernization and unitization of properties, has brought lifting costs at Smackover down 36 per cent. Some of the investments have paid out in 1½ years' time. This has been accomplished as the result of 9 years' work at the Smackover unit, which comprises properties owned equally by Phillips Petroleum Co. and Lion Oil Co., and operated by the former concern.

The Smackover field was discovered in 1922. It passed through a historic period of rapid development and flush, uncontrolled flow to a status approaching marginal production, hampered by low reservoir pressure, increasing water, and attendant high costs of lease operation. The pumping equipment, comprising standard rig fronts and central power units, became obsolete and well worn. Production continued with mounting costs in repairs, maintenance, reworking, and lease labor.

In 1937, Phillips Petroleum Co., an operator in the field, began a survey of leases with the object of improving production and reducing the high lifting costs per barrel of net oil recovered. Engineers conducted thorough dynamometer tests on individual wells and recommended installation of modern electric-driven pumping units in certain specific cases.

Accordingly, 30 such units were installed in 1937 and early 1938. The modernization program was interrupted by the decline in oil prices in 1938 and its resumption did not become feasible until late 1943. By that time results from original installations incited further investment and 128 more wells were electrified during 1944 and 1945.

Meanwhile, unitization of leases was recommended and the Phillips-Lion Smackover unit was formed from leases of the two companies, plus additional production acquired by purchase and exchange with other companies in the field. At present, the unit incorporates 4,066 acres and a total of 282 wells. Most wells produce from the Nacatoch sand. All of the 158 wells newly equipped produce some water. The average monthly production from the 158 wells is 79,000 bbl. of oil and 2,178,000 bbl. of water. Gas production is negligible. No marked increase has been noted nor is expected from wells producing from the Nacatoch, Blossom or Prim sands but water withdrawals are increasing in Graves—and to a lesser extent in Meekin-sand wells.

Wells Vary Widely in Horsepower Requirements

Those wells already converted to modern equipment represent a wide range of pumping demands. Total fluid withdrawals vary from 10 bbl. daily from 2,000 ft. to a maximum of over 1,900 bbl. daily from 2,300 ft. Power ratings of motors on existing electric pumping units range from 3 to 75 hp.

Prior to conversion, each well was studied individually and the size and power requirement of each installation was computed according to the empirical formulas:

$$\text{Peak polished rod load} = (\text{wt. rods} + \text{wt. fluid})\left(1 + \frac{\text{Stroke} \times \overline{\text{SPM}^2}}{70{,}400}\right)$$

$$\text{Peak torque} = [\text{Peak polished rod load} - (\text{wt. rods} + \tfrac{1}{2}\ \text{wt. fluid})]\frac{\text{Stroke}}{2}$$

These formulas have been found adaptable to such installations. Con-

Pumping 10 bbl. of oil and 3 bbl. of water daily, this unit was pounding low on stroke. Stroke was reduced from 22 to 18 in., performance improved and power input reduced to 1.4 hp.

tinued study of wells after conversion has aided in improving their production and better equipping additional wells. In some cases, horsepower requirements have been reduced by one-third by changing types of pumps. Common practice with old equipment was to pump at greatest possible speeds regardless of pounding, to recover maximum production. In new installations, constant study by engineers and pumpers has resulted in improved production by adapting length of stroke and pumping speed to conditions causing least pounding, thereby reducing maintenance, repair, down time, and kilowatt hours used per barrel of fluid lifted.

Power measurements of individual wells are easily made. Switch boxes on all leases are equipped with test jacks and within a few minutes the average power input to a well can be measured with a watt-hour meter, and the peak motor power input with a watt meter. These tests, made periodically, augment studies of speed variations and pump performance to produce the best possible pumping conditions for each well and prevent the waste or danger of overpowering or underpowering wells.

Results in High Electric Load Factor

The wells are not prorated and are pumped continuously. The negligible downtime on the new installations results in a very high load factor in the purchased electric power. In January 1946, as an example, the load factor was 98.3 per cent. This in turn provides a favorable bulk power demand from the standpoint of the utility furnishing power to the unit. It also contributes to the lower power rate, which for the same period averaged but 6.4 mills per kilowatt hour. This includes rental on primary lines to the field. Transformer banks and secondary lines to leases are owned by the operators. All electric power is metered at one point.

To maintain the high load factor and eliminate downtime on wells, time-delay relays have been installed in the switch boxes of most new installations. After motors have cut out following a voltage dip, caused, for example, by lightning, these devices bring wells back on production one by one, at intervals which may be anywhere between 1 and 100 seconds. The result is a gradual resumption of total electric load over a period of 100 seconds. Since power surges often occur at night without the pumper's knowledge, wells dependent on manual switching might be out of operation for as much as 8 hours. Without this protection, in addition to lost production, reworking costs would increase. The Smackover wells, particularly those in the Nacatoch sand, will often "sand up" if they are not pumped continuously.

Results Exceed Estimates

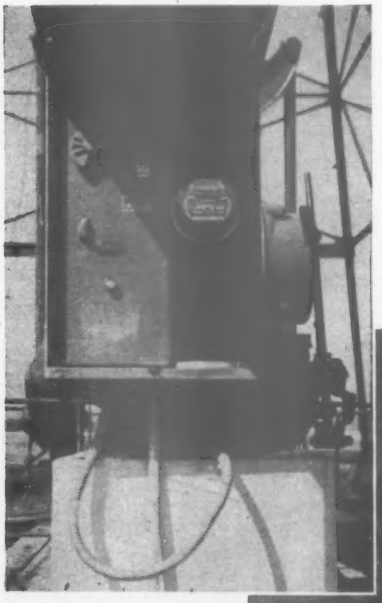
Results from the new installations in the Smackover unit have exceeded engineers' estimates in nearly all phases. A recent 6-month report on the operation underscores the benefits derived from the modernization program. The report, to be representative and factual, covers 19 leases and a total of 82 wells, of which 69 were equipped with new electric-driven pumps prior to July 1945.

The average lifting costs since modernization have been reduced 36 per cent. Lifting costs in this survey include power, repair and maintenance, pumpers' labor, supplies, trucking, and well servicing; all charged to the 19 leases. Taxes, insurance, and overhead are not charged as lifting costs. As compared to probable production, estimated from the decline curve prior to conversion, the leases produced 19.5 per cent more oil with the new equipment. Payout on the investment for 69 wells is estimated at 1.9 years, neglecting the subsidy which was effective August 1, 1944. This is in line with actual payout results on other early installations.

Only in regard to actual oil production did the operation fall short of engineers' expectations. Reasons were: failure of the Graves sand to increase production as predicted; abnormal production decline in some of the 13 wells on the 19 leases, not electrified and continuation of production decline at the new higher level.

The installation of new pumping equipment on Smackover stripper wells is of importance from a conservation standpoint. Although it is too early to make predictions from decline curves, the decreased lifting cost coupled with the increased oil production over that of extrapolated decline with the old equipment will certainly result in substantially increased oil recovery.

The subject of much conjecture and interest, operation of the Smackover unit now shows that a well-engineered modernization program applied to marginal production can prove a profitable investment. In the opinion of engineers concerned with the operation, production in other like fields could similarly be improved, provided low rates of purchased electric power were made available to operators.



***Above:** Switchbox at typical well installation showing time-relay, upper right, and watt-hour meter installed for measuring power input to well*

***Below:** One of the largest installations in the Smackover unit, this pump handles approximately 70 bbl. of oil and 1,700 bbl. of water daily. It is operated at seventeen and a half 108.35-in. strokes per minute and is powered by a 60-hp. motor*

Now it's

SUPPLY BOVAIRD COMPANY

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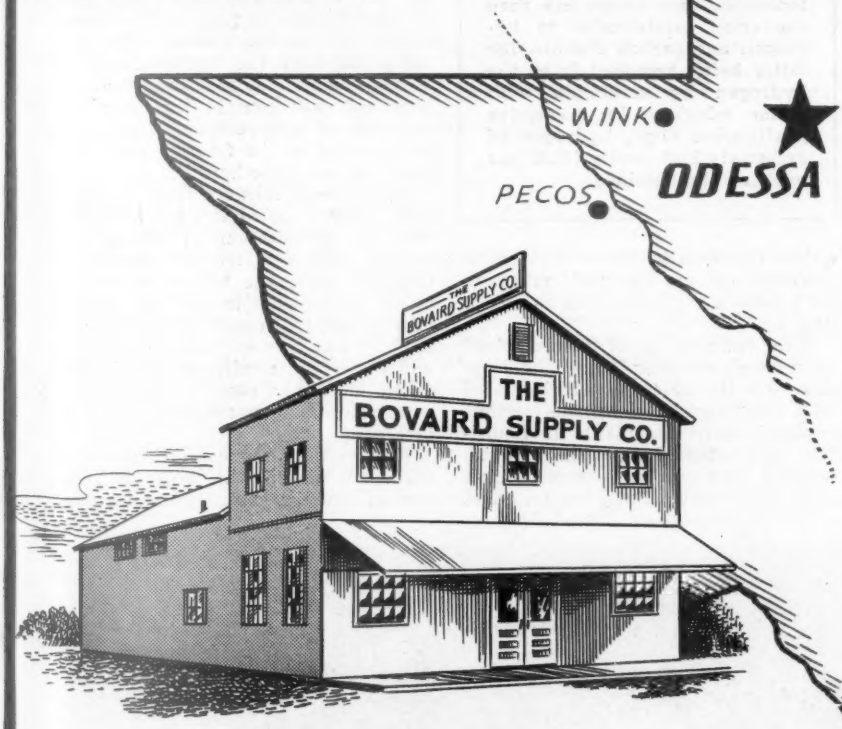

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New Plant Will Provide Pattern for Synthetic-Liquid Fuels Industry

by Fabian R. Staley

THE Department of Interior awarded a contract to The Girdler Corp., Louisville, for designing, erecting and placing in initial operation a plant for production of hydrogen and synthesis gases at the new synthetic-liquid-fuels laboratory now under construction for the Bureau of Mines at Bruceton, Pa. The plant will be completed by August 1, 1946, and will have a capacity of 110,000 cu. ft. of hydrogen and 120,000 cu. ft. of synthesis gas daily. These gases are required for investigation of the hydrogenation and gas synthesis processes for producing synthetic oils and gasoline.

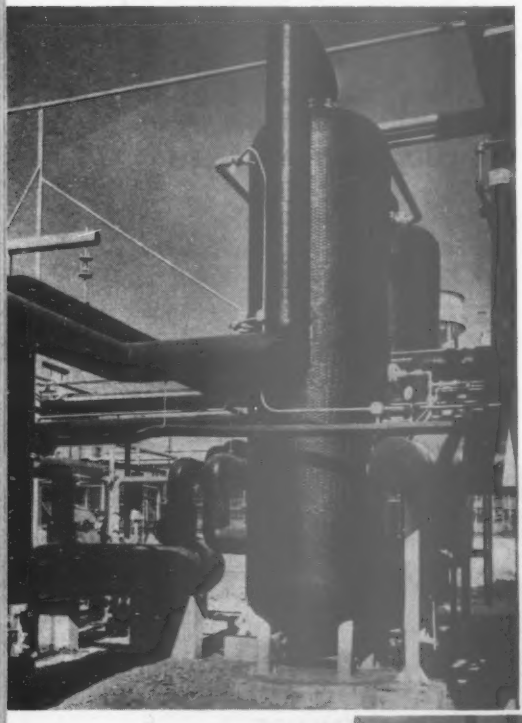
IN the hydrocarbon-steam process pure hydrogen is produced by reacting hydrocarbons with steam over catalysts at elevated temperatures (about 1,500° F.) under conditions such that the hydrocarbons are almost completely converted to carbon oxides and hydrogen. Carbon monoxide and steam are then converted catalytically to hydrogen and carbon dioxide, the latter being removed from the hydrogen by scrubbing with amine solutions. By successive purification steps, hydrogen of extremely high purity (99.97 per cent) can be obtained.

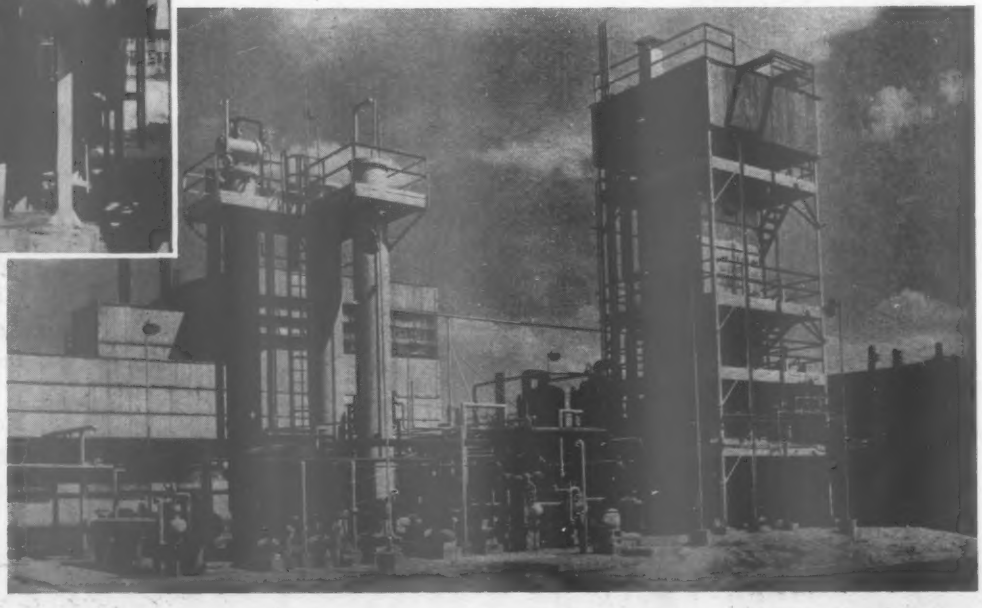
After technical problems are solved by research and development work at Bruceton, the processes will be tested on a commercial scale at the wartime synthetic-ammonia plant in Louisiana, Mo., which the Bureau of Mines recently took over for conversion into a synthetic-fuels demonstration plant. With this arrangement, a pattern will be provided for private enterprises to develop an American synthetic-liquid-fuels industry.

In the process to be employed, natural gas is compressed to attain flow through the plant after being desulfurized by treatment with activated carbon. Steam is added to the gas and the mixture is heated to approximately 1,500° F. over a catalyst which promotes reactions to form carbon monoxide and carbon dioxide. The decomposition of the hydrocarbons is nearly complete so that the hydrogen produced will contain less than 0.1 per cent of hydrocarbon. Heat must be supplied to the furnace since the reactions are endothermic.

The gaseous mixture from the furnace is then cooled to approximately 700° F. by addition of steam and passed into a converter containing catalyst where the carbon monoxide reacts with steam to produce carbon dioxide and hydrogen. The reaction is slightly exothermic. It is reversible, and under the conditions maintained about 90-95 per cent of the carbon monoxide is converted to carbon dioxide.

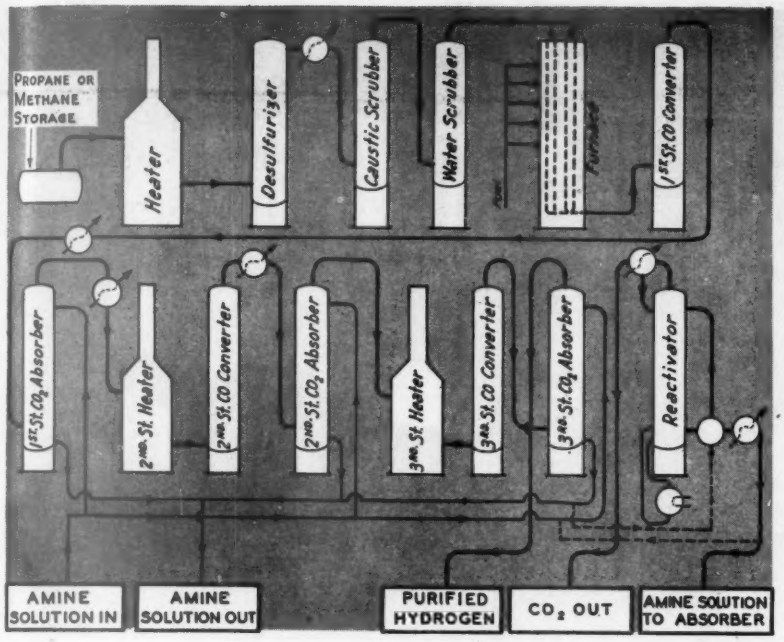
The carbon monoxide converted gases are cooled, the water is condensed and the cooled gases flow to





Above: Carbon monoxide converter in a steam-hydrocarbon hydrogen plant

Right: A Girdler plant for producing hydrogen from hydrocarbons and steam



Flow diagram of a Girdler steam-hydrocarbon hydrogen plant

an absorber, where carbon dioxide is removed by contact with an aqueous solution of monoethanolamine. This purified gas is then mixed with steam, preheated to 700° F. and passed through a second carbon monoxide conversion chamber, which in turn is followed by a cooler and a second carbon dioxide absorption step. Finished hydrogen gas then flows to the gas holder for use in the synthetic fuel laboratory.

The chemical reactions involved in the processes are indicated as follows:

(1) $CH_4 + H_2O \rightleftarrows CO + 3H_2$

(2) $CO + H_2O \rightleftarrows CO_2 + H_2$

(3) $CH_4 + CO_2 \rightleftarrows 2CO + 2H_2$

The formation of synthesis gases, which is a mixture of hydrogen and carbon monoxide is shown in (3) above. Carbon dioxide for this production is obtained from flue gas.

Equilibrium compositions in the methane-steam reactions are given by Reed.[1] They are shown in Table 1.

At the higher temperatures, the methane content of the reaction products is negligible.

The hydrocarbon-steam process is now in second place with respect to hydrogen-producing capacity in the United States. At least 17 plants with a total manufacturing capacity of over 4 billion cubic feet per month use this process. Seven of these plants use the hydrogen for ammonia synthesis. The steam-water-gas process is the largest producer of hydrogen in this country. Other processes used on a commercial scale for hydrogen production include the electrolysis of water, the steam-iron process, the steam-methanol process, and thermal decomposition of hydrocarbons.

Hydrogen Catalysts

In the hydrocarbon - steam process, the reaction is usually carried out in the temperature range 1,200°-2,000° F. Nickel is the catalyst generally used. At temperatures near 1,500° F. an active form is desirable. This is obtained by mixing nickel compounds with a refractory support and reducing the nickel compounds in hydrogen or in the reaction mixture. A good catalyst, properly prepared, will have long life, will give rapid reaction between steam and hydrocarbon, and will cause a minimum of undesirable side reactions which tend to lead to the deposition of carbon in the catalyst tube.

In the catalytic oxidation of the carbon monoxide, in the mixture with hydrogen, to carbon dioxide using steam as the oxidizing agent, a wide variety of catalysts is available for this reaction. However, very few of them are satisfactory for commercial use. An iron-oxide-base catalyst, which is especially prepared for long life, high activity, and mechanical strength has been developed.

Other catalysts which may be used in the manufacture or purification of hydrogen include those required for the desulfurization of hydrocarbons. Activated bauxite may be employed to convert sulfur compounds to hydrogen sulfide at elevated temperatures. Various metallic oxides, such as iron oxide or copper oxide, also may be used for this purpose.

TABLE 1—EQUILIBRIUM COMPOSITIONS IN PERCENTAGES

Component—	930° F.	1,340° F.	1,500° F.	1,600° F.	1,700° F.	1,800° F.
H_2	61	75.8	76.1	76.1	75.9	75.9
CH_4	23	1.0	0.1	0.04	0.01	0.01
CO	4	17.2	19.1	19.7	20.3	20.7
CO_2	12	6.0	4.7	4.2	3.8	3.4

TABLE 2 — MATERIAL AND UTILITY REQUIREMENTS PER 1,000 S.C.F. OF HYDROGEN (PURE)

Material—	Quantity
Process material:	
Propane, gal.	2.75
Or	
Natural gas, cu. ft.	250
Fuel (gas or oil), B.t.u.	35,000
Steam, lb.	380
Cooling water, gal. (30° F. rise)	1,800
Power, kwh.	2
Chemicals, cost in cents	2

References

1. Reed, R. M., "Commercial Production of Pure Hydrogen," Trans. A.I.Ch.E., Vol. 41, No. 4, Aug. 25, 1945.

2. Reed, R. M., "Present-Day Hydrogen Manufacturing Processes," The Girdler Corp., Louisville.

3. Hydrogen H_2, The Girdler Corp., Gas Processes Division, Louisville.

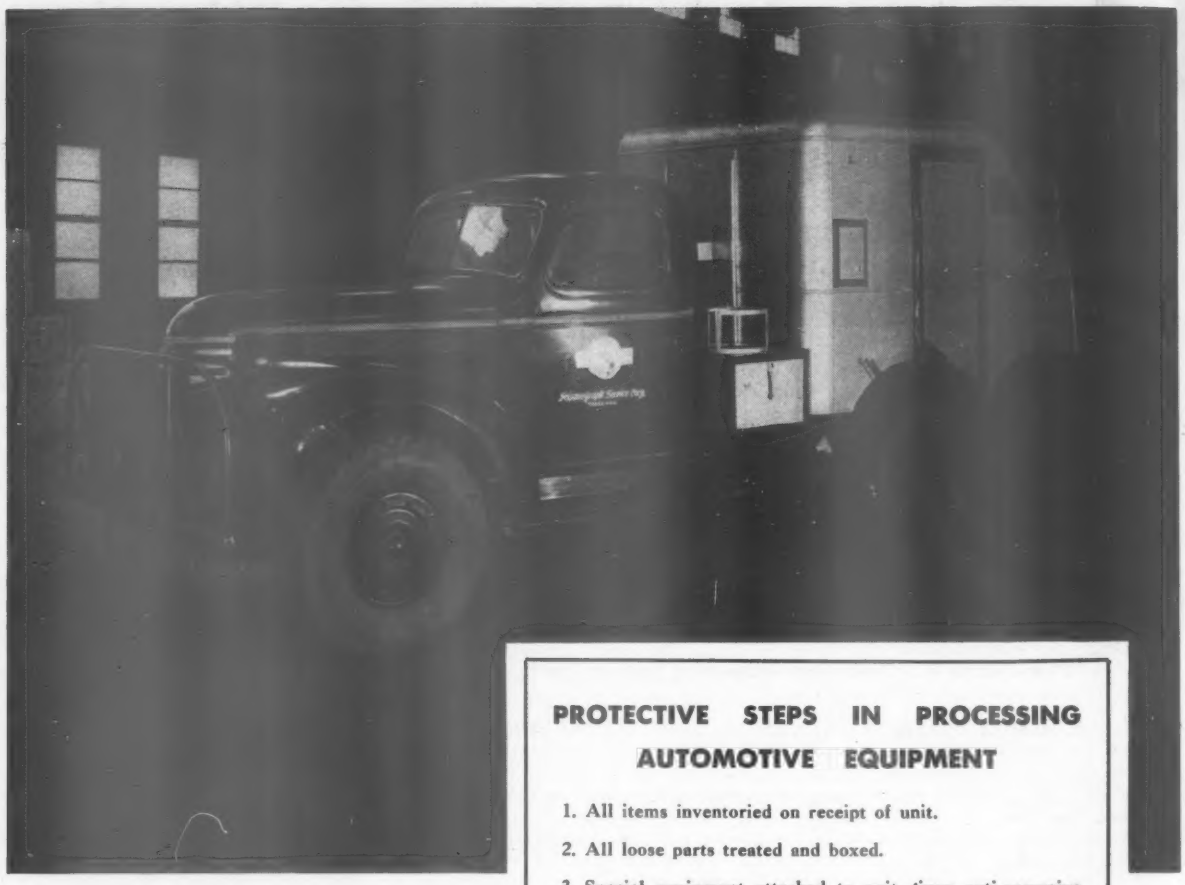
Engineers Hold Joint Meeting in Dallas

The use of the engineer in the petroleum, gas, and natural-gasoline industries was the subject of a joint meeting of the North Texas and East Texas sections, A.I.M.E., and the Petroleum Engineers' Club of Dallas, held April 19 at Hotel Adolphus, Dallas.

The subject was discussed in the form of a "hearing" at which expert witnesses testified as to their respective duties and responsibilities as engineers, before a panel of prominent oil - company executives, operators, and drilling contractors. Following his 10-minute discourse, each engineer was subject to examination by written questions from the panel and the floor.

Speakers for the evening included: W. A. Alexander, Shell Oil Co., Inc., Houston; Bowman Thomas, Humble Oil & Refining Co., Houston; H. Dotterweich, Texas College of Arts and Industries, Kingsville; William D. Owsley, Halliburton Oil Well Cementing Co., Duncan, Okla.; Roger Henquet, Schlumberger Well Surveying Corp., Houston, and Norman L. Dorn, Lane-Wells Co., Los Angeles.

Francis E. Miller, former assistant to the president of McKesson & Robbins, Inc., New York, has been elected president and a director of Mid-West Refineries, Inc., and also of National Refining Co. of Cleveland.



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1. All items inventoried on receipt of unit.
2. All loose parts treated and boxed.
3. Special equipment attached to unit given anti-corrosive compound treatment.
4. Exposed parts wrapped in waterproof, grease-proof paper and encased for extra protection.
5. Plywood panels fitted over the side windows and windshield, held in place by cloth-backed waterproof tape.
6. Plywood panels are placed to protect the radiator and waterproof paper fitted to shroud all openings.
7. All electrical parts are protected and wherever it is practical, individually wrapped.
8. Unit is completely drained and motor is protected against corrosion.
9. Additional protection is given to exterior if any special conditions are to be encountered en route to destination.
10. Warning Tags indicating that water, oil and gas have been drained, are attached and cab completely sealed.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Simplified Flow Diagram

Brugma Distillation Process

Can you present a flow diagram of the Brugma distillation process?—R. A. C.

References available to this department fail to show the origin of the Brugma process (Fig. 1) but it was suggested many years ago by Foster Wheeler Corp. Fig. 1 shows an extreme application of the process by which three towers are employed to separate eight products. The general principles underlying the process are so fundamental that doubtless many designers have employed the process or modification of it without being aware of the Brugma process, as in "Isolation of Hydrocarbon Stocks for 100 - Octane Aviation Fuel" on page 38 of the January 8, 1942, issue of The Oil and Gas Journal. A description of the Brugma process appeared in the September 1941, issue of the Petroleum Refiner, page 86.

It is usually thought that the number of carefully fractionated products that can be produced from a series of fractionating towers is one more product than the number of towers. In such a system (Fig. 2) one product is produced at the top (or bottom) of each tower except that two products can be produced in the last tower. Such is thought to be necessary because in any multidraw tower (an overhead and one or more sidestream products) the top product passes the sidestream plate and contaminates the product withdrawn there.

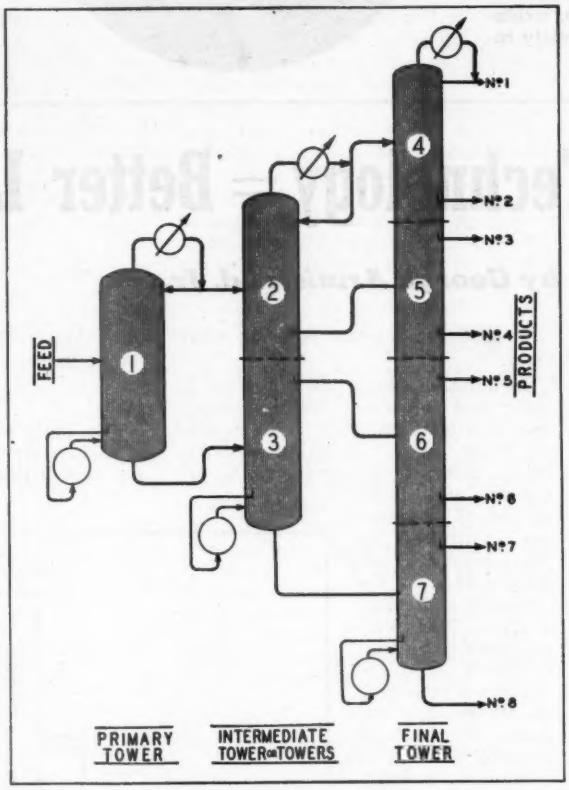
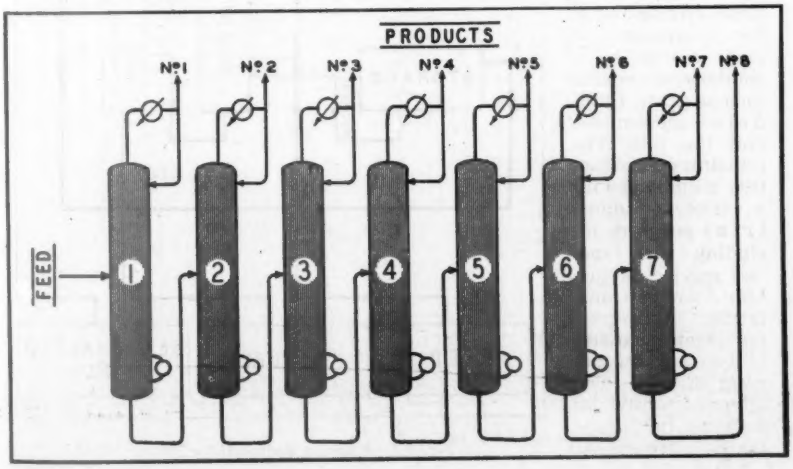


Fig. 1 (Above) *Fig. 2 (Below)*



Difficulty Eliminated

This difficulty is eliminated in the Brugma process by first splitting the multicomponent feedstock into two well-fractionated products (Tower 1). The two products so produced are then fed into what may be thought of as Towers 2 and 3 although in the Brugma process they are arranged one above the other so that the top of the lower tower (No. 3) adjoins and delivers vapor to the bottom of the upper tower (No. 2). The four products so produced may be admitted to still another very tall fractionating tower which may be considered as four towers arranged one above the other. By such a system a large amount of the refluxing and reboiling required in a conventional system is eliminated. This of course saves in condenser and reboiler surface and in cooling water, pumping costs and reboiler heat. Reflux is saved or used over again because at each adjoining of columns (No. 2 to No. 3, No. 4 to No. 5, etc.); the vapor from one column is condensed by the bottom liquid of the column just above. It is claimed that the condenser load on the three columns shown on this page is only 60 per cent of what would be required by a conventional seven-column arrangement.

The process is theoretically sound. From a practical standpoint, control of the amounts of the many sidestream products is difficult. In addition it should be noted that the total number of trays required is not altered. With adequate controls and tall enough towers, the number of products separated by the Brugma process are: One tower, 2 products; two towers, 4 products; three towers, 8 products; four towers, 16 products.

LUBRICATING-OIL properties which must be improved are: Oxidation resistance, viscosity index, pour point, and carbon deposition. Solvent extraction is employed to remove or reduce nonparaffinic components, with six processes in use operating 90,000 bbl. per day capacity. Solvent dewaxing is used to the extent of 64,000 bbl. per day, to remove waxes and improve pour points. Deasphalting, as with liquid propane, is used widely to eliminate petroleum naphtha-insoluble components and to improve carbon deposition, oxidation resistance, and viscosity index.

MODERN REFINING PROCESSES

8. Improved Technology = Better Lube Oils

by George Armistead, Jr.

THE advances in lubricating-oil refining technology over the past 15 years have greatly improved the quality of lubricating oils as a whole, and have greatly widened the range of crudes usable for high-quality lubricants. An important concurrent development, from the refiner's viewpoint, has been reduction in cost of production even with improved product quality, through the use of more efficient processes and lower-price crudes. In addition, more has become known about the required properties of lubricating oils and improved methods of testing have been brought into use that are increasingly significant as to the actual performance of oils in service.

Another factor in the development of better lubricants has been the increase in knowledge of the effect of various additives and the appearance on the market of a large number of these materials for various specific purposes. The requirements of lubricating oils for war service under very diverse, and sometimes the most severe, service conditions, have contributed to the advancement of the art to its present stage.

The principal desired qualities of lubricating oils with which the refiners is concerned, and which determine the processing scheme to be followed in manufacture, are:

1. Resistance to oxidation, which in turn means less sludge, varnish, and engine wear.
2. Proper viscosity and minimum change of viscosity with temperature, i.e., high viscosity index.
3. Low pour point and freedom from solidified wax haze.
4. Minimum carbon forming tendency.

In addition, there are a number of other less important desired properties, usually controlled by or related to those above, including demulsibility, color, fluorescence, flash, ash content, and acidity as well as some that are controlled by the addition of additives such as detergency and corrosiveness. The greater proportion of lubricating-oil production is employed in combustion engines, over a wide range of duties from passenger automobiles to heavy-duty truck engines and diesel engines, or in the lubrication of parts moved by a combustion engine such as gears, fluid-drive mechanism, and the like. The remaining production is employed for a variety of industrial purposes including such special service as turbine and transformer oils requiring exceptional stability over long periods of time. The intended duty as well as the crude source determines the manner of processing the oil in the refinery.

Distillation

The basic step in the separation of various grades, or fractions of various viscosities, of lubricating oils

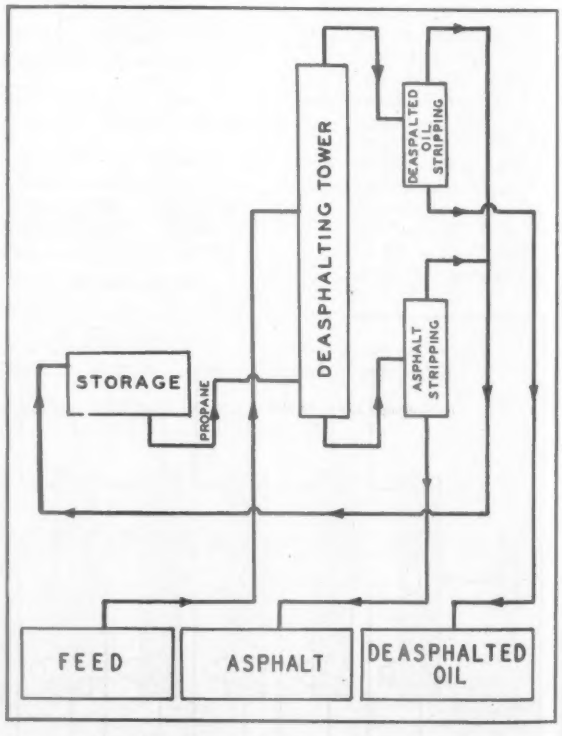


Fig. 8-1—Propane deasphalting (tower type)

from the crude is fractional distillation. For the production of the lower viscosity grades such as S.A.E. 10, 20, and 30, the raw stock is usually made as a distillate cut of the proper viscosity from vacuum distillation. The heavier materials may, in some cases, start with a crude residue as a product of vacuum distillation, although in others they also may start from vacuum distillates. The practice of vacuum distillation for the production of lubricating stocks has become well standardized, although subject to some variations according to required duty, sometimes involving two-stage operation, and may be employed to separate the desired cuts either before or after the other principal manufacturing steps. In some cases the operation may, as in the Filtrol fractionation process[5] be combined with a clay decolorization step in which the oil is mixed with clay prior to the vaporization heating. Typical yields from vacuum distillation of two representative reduced crudes for lubricating oil are shown in Table 8-1.

TABLE 8-1

	Volume per cent basis crude	
Crude source—	E. Tex.	Mid-Cont.
Reduced crude to vacuum distillation	50	45
Yield—		
Gas oil	17	18
100/100° S.S.U. visc.	5	4
250/100° S.S.U. visc.	10	6
400/100° S.S.U. visc.	3	4
Residuum 400/210° S.S.U. visc.	15	13

The separation of lubricating cuts by viscosity generally is done primarily by distillation and may be supplemented by blending to final specifications as described later.

Undesirable Constituents

The undesirable constituents in lubricating oils comprise generally three types of compounds, namely, asphaltic materials insoluble in petroleum solvents; aromatic, unsaturated and other nonparaffinic compounds, and waxes. The first two classes contribute to poor oxidation stability with resultant sludging and engine wear, and the second to low viscosity index[1,2] as well, while the third, of course, controls the temperature of solidification of the oil. The combustion engine is a good oxidizing device, operating at elevated temperatures, in the presence of oxygen and metals which may catalyze oxidation reactions. Some of the products of oxidation are acidic, resulting in bearing corrosion, and the other oxidation products form sludge which tends to clog oil lines and to form coatings on the pistons and other parts known as lacquering and varnish.

Since these effects result in engine wear, and possible ultimate failure, the removal of material of low oxygen stability is a key step in the refining of lubricating oils. Such stability can be achieved by chemical treating such as sulfuric acid or aluminum chloride, but in the majority of cases it is found more economical to remove the undesirable materials by extraction methods. The asphaltic components, because of their relatively low volatility, can be separated by distillation. In modern refinery practice the separation of the two classes of oxygen-unstable materials generally requires, in effect, two separate operations, since there is no presently used solvent or similar method for the simultaneous removal of both. These operations (other than distillation) are known respectively as deasphalting and solvent extraction, although there is one process employing two solvents which carries out both steps simultaneously in a single operation, known as double-solvent extraction.

In general, the removal of asphaltic material can be effected by: (a) sulfuric acid treating, (b) distillation, or (c) solvent deasphalting such as with propane.[6,7,8] The function of the two last-mentioned processes in separating the component of the oil into high and low-boiling fractions are closely similar, and the two processes are actually competitive for the purpose. One of the newer features of propane deasphalting is the use of the "tower" system[3] as distinguished from the "stage" system of countercurrent extraction of the oil which gives greatly improved products and flexibility compared to the latter, and extends the range of use of propane deasphalting. The propane deasphalting process illustrated in principle in Fig. 8-1, operates in the range of 100°-200° F. with up to 10:1 volume propane: feed ratio, depending upon the feed character and extent of removal of the heavier components desired. The deasphalted oil is withdrawn in the propane phase, and the asphalt phase containing some propane is withdrawn separately and propane recovered from both for return to the system. Typical deasphalting results on a residual oil are shown in Table 8-2.

TABLE 8-2

Inspections—	Feed	Deasphalted Oil
Gravity, °A.P.I.	15.5	24.0
Flash, °F. C.O.C.	570	545
Fire, °F. C.O.C.	640	620
S.U. visc./210° F.	507	112
Color, A.S.T.M.	Black	6
Carb. res., %	11.1	1.2
Pour point, °F.	90	115+
Visc. grav. const.	0.879	0.833
Yield—		
Volume, %	100.0	56.0

Solvent Extraction

The solvent-extraction processes employing single solvents serve to remove nonparaffinic fractions of low

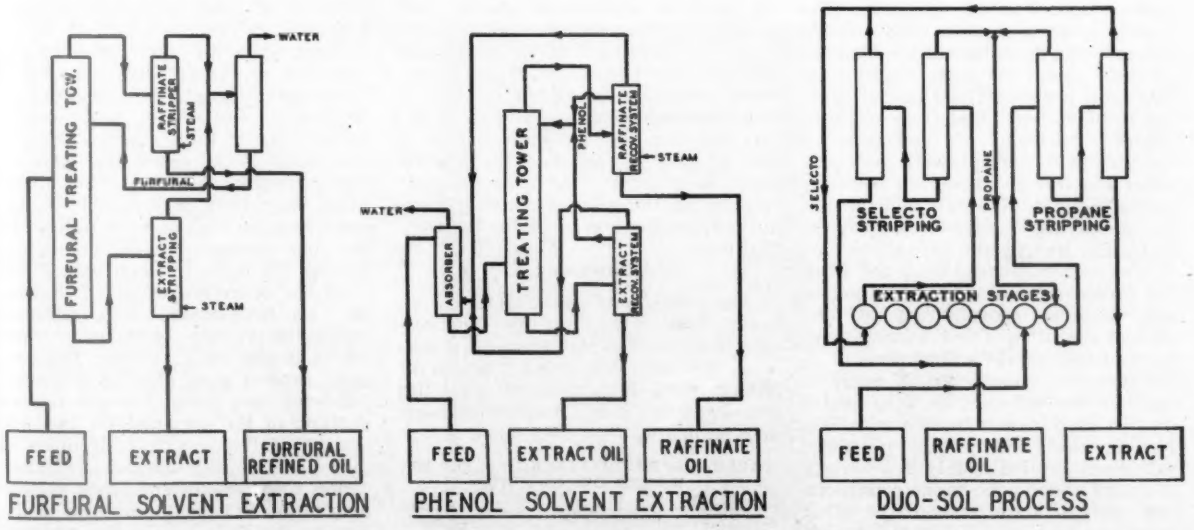


Fig. 8-2—Solvent extraction process

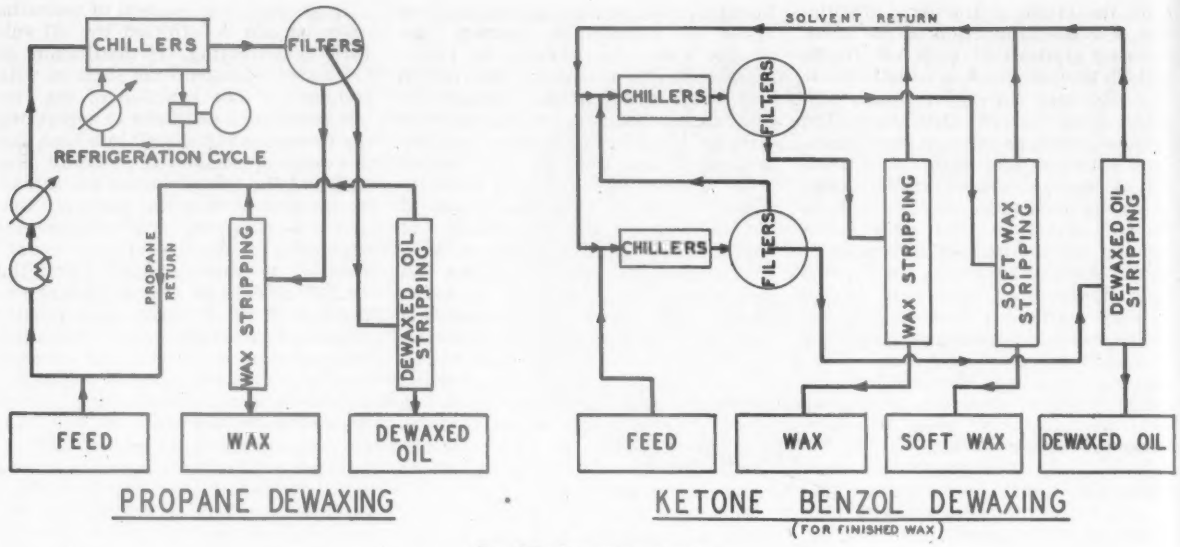


Fig. 8-3—Dewaxing process

oxygen stability and low viscosity index, thus improving the quality of the oil in both respects. The principal solvent refining processes with their relative present capacities installed or under construction are listed in Table 8-3 and the three used most extensively are illustrated diagrammatically in Fig. 8-2.

TABLE 8-3—APPROXIMATE INSTALLED CAPACITY OF REFINED OIL OUTPUT

Process—	Bbl. per day
Furfural solvent extraction	27,460
Phenol solvent extraction	25,250
Duo-Sol process	21,190
Chlorex solvent extraction	4,860
Nitrobenzene solvent extraction	1,930
Edeleanu process	8,775

These processes rely in general on the solution of the lower-viscosity-index hydrocarbons (aromatic, unsaturated, oxidizable bodies) in the solvent, leaving the higher-viscosity-index materials (paraffinic and more stable bodies) as an oil phase. The processes listed above employ a single solvent with exception of the Duo-Sol process and, in some cases the Edeleanu process. The Duo-Sol process employs two immiscible solvents, namely "Selecto" (a mixture of cresylic acid and phenol) and propane, the former dissolving the low-viscosity-index materials and the latter dissolving higher-viscosity-index materials, leaving the asphalt as part of the extract phase. Thus the Duo-Sol process effects solvent extraction and propane deasphalting as one process operation. The Edeleanu process employs liquid sulfur dioxide as the selective solvent but in order to improve the solvency of SO_2, benzol is often used in combination with SO_2. The furfural and phenol processes have been applied widely to a variety of stocks under wide-range conditions and each of these solvents is often employed on residual stocks which have been propane deasphalted previously. The "Chlorex" (dichloroethyl ether) and nitrobenzene processes operate under relatively lower temperature conditions than the other solvents, due to high oil-solvent power of the dichloroethyl ether and nitrobenzene.

The use of sulfuric acid for general quality improvement and special finishing of oils has not been altogether discontinued, and there is still considerable production using this method alone or in conjunction with one of the modern processes.

Fundamental operating variables in all of the solvent refining processes include temperature and ratio of solvent to raw feed in addition to several other factors of importance such as arrangement of contacting and settling equipment and settling time. The results from the processes depend to a large degree on the accurate control of these variables for the production of optimum yields and quality, that is meeting the required specifications with the rejection of the minimum amount of oil to nonlubricating uses. Such optimum operation requires a thorough knowledge of the stock being handled and the interrelation of the process variables of the process used. Kalichevsky[8] has discussed some typical relationships of operating conditions, quality and yield, for the Duo-Sol process.

Dewaxing

The removal of paraffin wax from both distillate and residual lubricating fractions can be effected by several methods, the more modern of which, with their installed capacities are listed in Table 8-4 and illustrated diagrammatically in Fig. 8-3.

TABLE 8-4—RATED CAPACITY OF DEWAXED OIL OUTPUT

Process—	Bbl. per day
Ketone-benzol dewaxing	47,320
Propane dewaxing	15,800
Bari-Sol process	4,270

In addition, there are installations of cold pressing and cold centrifuging which do not come within the above classification and aggregate a substantial amount of capacity.

The ketone-benzol process is capable of a high degree of flexibility in the removal of wax and the consequent reduction in pour of the oil, and is usable on both residual and distillate stocks. The propane process is also adaptable to both distillate and residual stocks. In operating on distillate oils with the propane process, a wax-modifying agent, such as petrolatum from residual stocks is usually added to the distillate charging stock for the purpose of modifying the precipitated distillate wax so as to secure high filter rates and maximum yields of dewaxed oils. These two processes operate by the chilling of the solution of solvent oil, which separates the wax which is subsequently collected on a rotary filter, following which the solvent is recovered from the wax cake and the dewaxed oil. An efficient use of heat exchange minimizes the amount of refrigeration required for the processes. In the case of the dewaxing the solvent itself is the refrigerant. Operating temperatures of these two processes vary from 0° to —50° F. depending upon the pour test desired on the final product. The ketone-benzol process produces finished wax direct from the operation which, if desired, can be fractionated into different melting-point cuts by separate treatments in the same system. The propane process may also be employed following dewaxing for the further deoiling of the wax and for the separation of the wax into products of different melting points. In cases where a wax modifying agent such as petrolatum has been employed in dewaxing distillate oils by the propane process, the distillate wax and petro-

latum are separated as a final step by vacuum distillation.

Cold pressing, which comprises chilling the oil down to 30° F. or below, depending on the oil and the dewaxing desired, followed by filtration, is one of the original methods of dewaxing and while remaining in use to some extent is generally limited to low-viscosity distillates and does not possess the flexibility of the solvent methods and is being superseded by them. Cold centrifuging is being commercially used to an appreciable extent, one form being the Bari-Sol process which employs a solvent of ethylene dichloride and benzol which is heavier than the wax, as an aid to centrifuging at temperatures below the solidification point of the wax.

A closely associated feature of wax removal is the purification of the wax removed. The removal of the entrapped oil with the wax was for years separated by sweating or batch fractional melting, which process also can be used to separate the chief melting-point grades of wax. While this process continues to be used to a considerable extent, the developments in solvent deoiling of wax have greatly improved the flexibility and economy of separation of the various melting-point fractions and the deoiling of wax produced from the ketone-benzol process. The melting point of the wax, in a given cut coming to the dewaxing plant is governed generally by the boiling point of the cut and this may furnish an initial segregation of the wax according to melting point. However, by selective treatment in a solvent dewaxing operation such as ketone-benzol or propane, further separation can be made between wax melting points over a wide range and in the case of microcrystalline wax derived from residual oils, waxes in the melting point range of 140° to 200° F. can be produced readily.

(This article is to be continued in next week's issue covering general manufacturing schemes, additives, and blending.)

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SAFE field PRACTICES

by Henry W. Boggess

Polished-Rod Safety Clamp Saves Fingers

THESE features on safety in field operations will appear in alternate issues. They are prepared by Henry W. Boggess, superintendent of personnel department for Sinclair Prairie Oil Co. The author joined the Sinclair companies on December 21, 1919, after serving in World War 1 and receiving the Purple Heart. Long prominently identified with safety efforts, Boggess is one of the original coorganizers and a past president of the Petroleum Safety Council and has served five terms as member of the executive committee and on the board of directors of the National Safety Council. He organized and served four terms as president of the Oklahoma State Safety Council, is a member of the American Society of Safety Engineers, and is the present chairman of the National Safety Committee of the A.P.I.

ONE of the oldest and most persistent hazards of oil fields is the common type of polished-rod stuffing box.

Severe hand injuries (frequently resulting in permanent-partial disabilities) are sustained by pumpers and roustabouts when, (a) packing stuffing boxes, and (b) removing or replacing polished rods during a rod-pulling job.

(a) Until 1944, the stuffing-box hazard remained unsolved because there was no simple, light-weight and inexpensive device on the market that could be carried in a pumper's pocket as he made his rounds to check his wells and hence, one that was instantly available when a stuffing box was found leaking.

During 1944, a major Mid-Continent oil company solved the problem by designing a simple, light-weight clamp which is called a "polished-rod safety clamp," (see illustration). Experience teaches that the age-old practice of using a strand of soft rope or a piece of wire to make a tie of a stuffing-box gland on a polished rod, all too frequently results in the loss of fingers, if not mutilated hands. This recently developed light-weight clamp is low in cost, particularly in quantity lots. Each injury it prevents will mean an average saving of around $1,000 in compensation and medical costs.

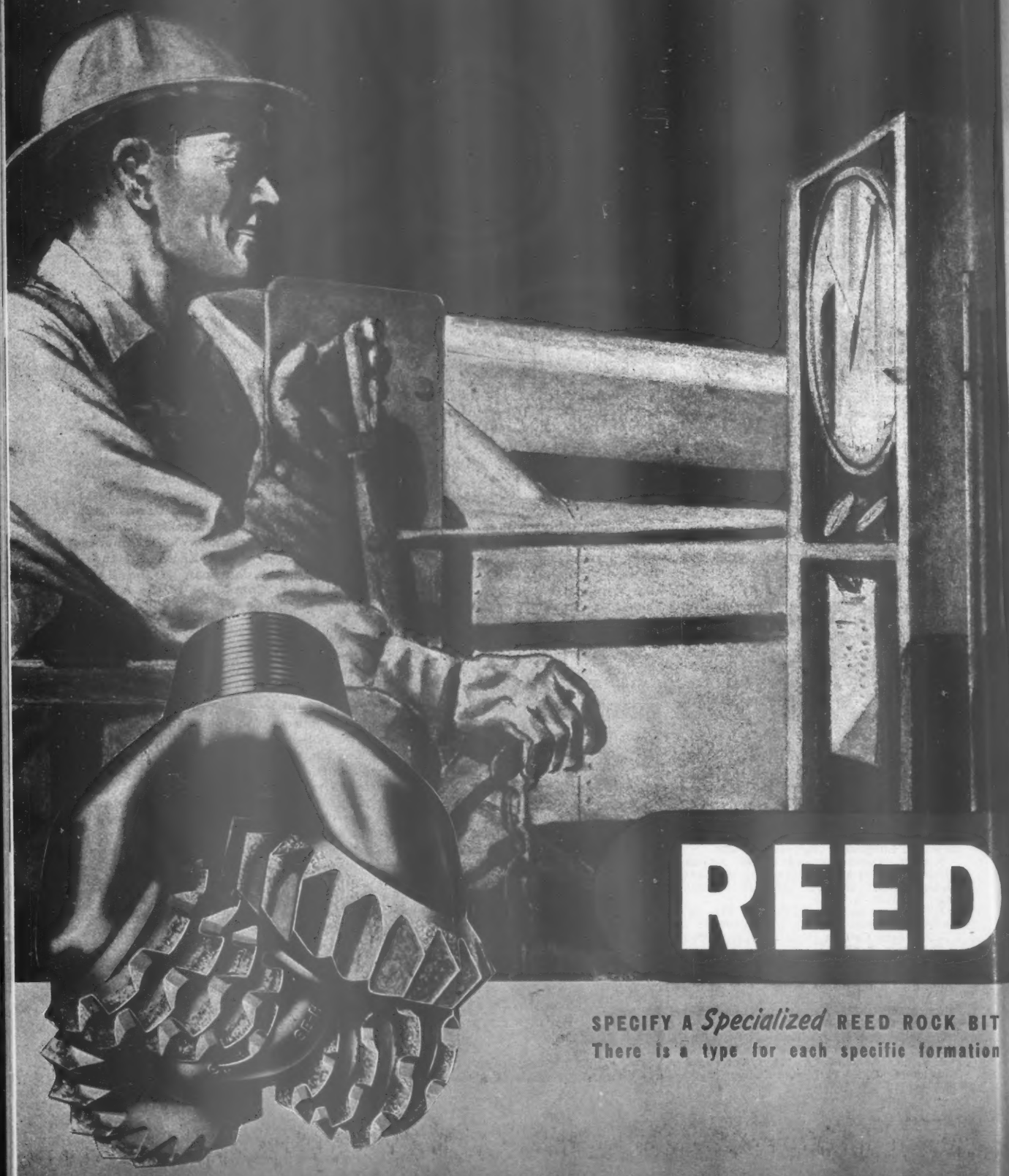
Pumpers seem reluctant to walk (round trip) to a central power, or to an oil house or tool house for a heavy-type polished-rod clamp (which cannot be conveniently carried in a pocket) merely to insure safety during the few minutes necessary to pack a box. This new-type clamp, however, can be carried in a pumper's pocket, even in the summer time when he wears only a pair of light-weight trousers and a shirt.

(b) Before laying down or picking up a polished rod during a pulling job, polished-rod clamp or clamps must be tightened so they cannot slip.

It should be impressed, however, that furnishing such a device to a pumper will not necessarily insure its use. Engineering the device is but one step in preventing stuffing-box injuries. The other steps are educating pumpers as to reasons for using the device, and enforcing the rule that the device must be used on every packing job.

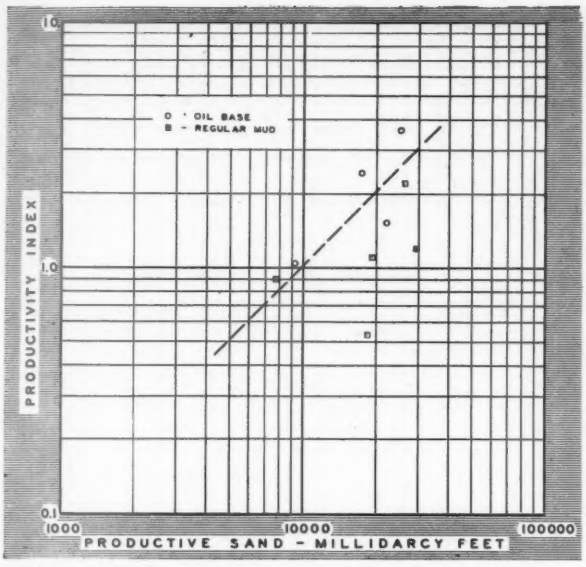
"WE MAKE

Speed with Less Weight WITH



REED

SPECIFY A *Specialized* REED ROCK BIT
There is a type for each specific formation



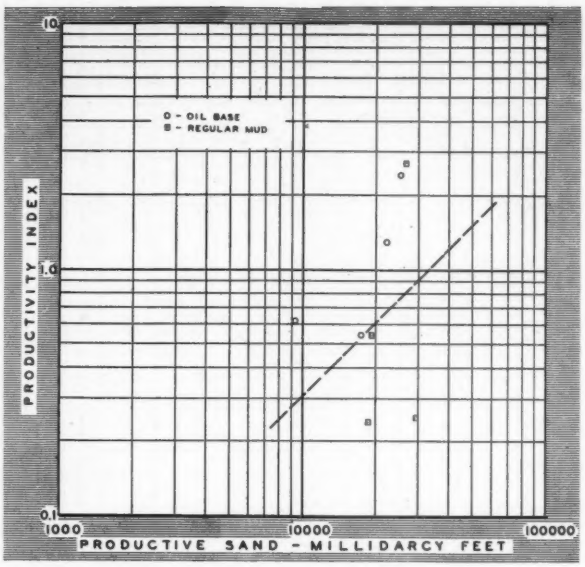


Fig. 1—(Left) Comparison of core analyses (millidarcy feet) vs. productivity index (bbl. per day per lb. drop in b.hp.), for initial well completions. Field "A," in central San Joaquin Valley. Fig. 2—(Right) Comparison, same field, after producing 200,000 bbl. of oil

OIL-BASE FLUIDS—Results and Use In Drilling and Completing Wells

by Glenn V. Kersten*

THE majority of oil personnel are intensely interested in obtaining the best possible type of well completion under operational conditions. Every effort is made to obtain maximum oil entry and maximum continued production of oil. Drilling fluids are conditioned to the lowest possible water losses through the oil zones. Oil-base fluids are being used where conditions of sand-fluid content and low permeabilities indicate the necessity of the smallest possible water-loss fluid.

Shortly over a year ago the industry was shown the results of numerous permeability tests on core samples of differing types of sands. It was demonstrated that sands containing hydratable material or which are exceedingly tight, are seriously affected by contact with water, lowering the permeabilities, in many cases, to an alarming extent. Fresh water affected the cores more than salt water. It was indicated that in many instances no water at all would be beneficial and that wells completed or repaired with a fluid having no water loss would perform more satisfactorily.

*Production engineer, Western Gulf Oil Co.

This paper was presented at the spring meeting, Los Angeles, of the Pacific Coast district, A.P.I. division of production. It is here given in slightly condensed form. In an early issue will be presented another paper on the same general subject, "Review of Special Water-Base Mud Developments," which also was delivered at Los Angeles.

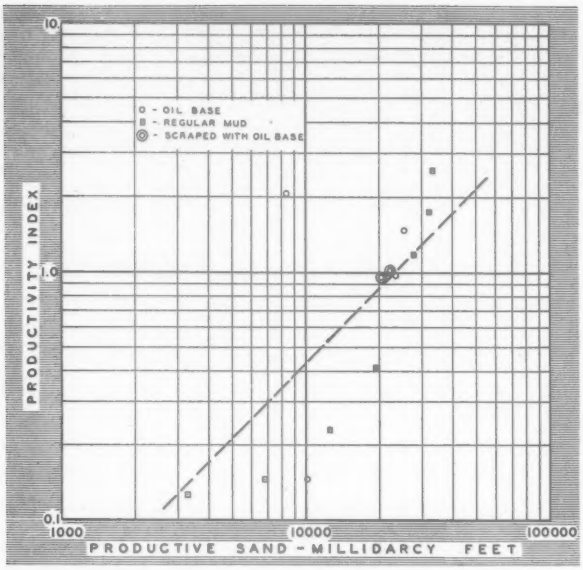
Results of Use of Oil Base Fluids

Earlier investigations have shown that there is an initial indicated improvement in well completion from the use of oil or oil-base fluids. Figs. 1-7 were developed to show that this indicated improvement is not confined to one field or one set of conditions. The figures shown are for five different fields; four from the southern portion of the San Joaquin Valley, and one from the Los Angeles Basin harbor area. Sands vary from low permeable sands containing hydratable material through high permeable clean sands and high permeable silty sands. In every field for which data were available, it is evident that an indicated initial improvement is made in the ability of the oil zones to yield fluid per pound pressure drawdown.

The plot of the ability of the sand to yield fluid per pound pressure drawdown against the number of millidarcy feet of sand open was chosen as the best yardstick with which to measure well capacity for any one set of conditions or field. In general, for the same millidarcy feet of sand, there is an indicated improved difference between oil-base initials and water-base initials, although there are a few cases where the oil completions are not so good, and where the water-base completion is exceptionally good.

It is important that the possible improvement gained by oil-base completion be maintained, for there are numerous cases of well-productivity increase several months after water-base completion. It is possible that the initial increase from oil base could be caught up with and even surpassed by many water-base completions. In the event this happened, the initial bother and expense from the use of oil base will have been in vain.

Figs. 2 and 4 were assembled to give an idea as to what happens after producing several thousands of barrels of oil. Only two fields were found



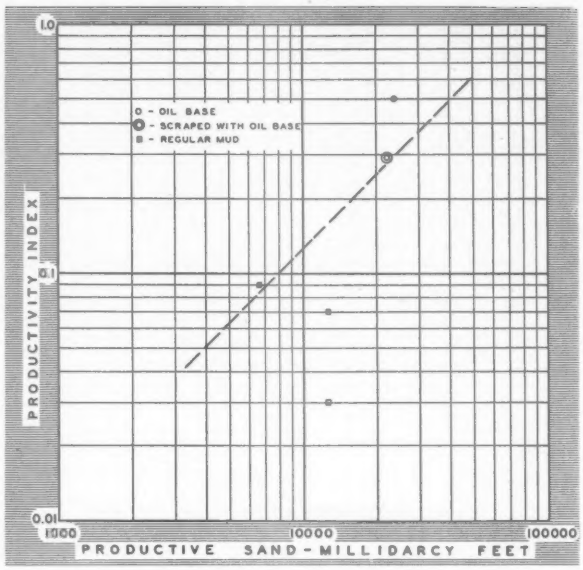


Fig. 3—(Left) Core analyses vs. productivity index, for initial well completions. Field "B," west central San Joaquin Valley. Fig. 4—(Right) Same field, comparison after 150,000 bbl. oil had been produced

with enough experience data to plot, although there are numerous cases of oil and oil-base completions of long years standing. Field "A" first had oil-base completions during 1939 and 1940. Field "B" had oil-base completions during 1942. Good records were kept as to productivity and volume. Both fields seem to indicate that the initial increase has been sustained through the production of 200,000 bbl. of oil from wells in Field "A" and 150,000 bbl. of oil from wells in Field "B." Unfortunately some of the wells completed and wall-scraped with oil base in Field "B" had to be shut in due to high ratio.

If this indicated sustained spread could be substantiated by more and better records, a true evaluation of the results of oil base on well capacity and recovery could be made. It is suggested that wherever possible, permeability, net oil sand, and productivity-index data be gathered so that an evaluation of the lasting effects of oil-base completions can be made before depletion occurs. It is not enough to show the management that the well flowed more initial oil and seems to perform better.

Other benefits derived from the use of oil base are in completion work and in the possibility of obtaining better interstitial water content. Completions are, in general, made easy for flowing wells since it is usually only necessary to displace the oil base with oil and the well will either flow immediately or after several hours. Swabbing time is largely eliminated. Its use opposite low-pressure sands eliminates the expense and work involved in washing and scratching. Fluid is changed to oil and the well is pumped in.

Use of Oil-Base Fluids

Oil or oil-base fluids have been in use for many years and in numerous fields. At present, oil base is or has been used in nearly all of the fields in the state. Depth of hole or temperature conditions offer no problem, since suspending agents for weight and viscosity control have been developed to a high degree of efficiency. Water has a detrimental effect on all oil-base fluids, but can be controlled by the addition of slacked lime. Most operators experience no trouble with up to 10 per cent water content.

It is often necessary to change casing programs when using oil base, since it is dangerous to have such fluids opposite a long open hole. The usual procedure is to obtain a primary water shutoff above the oil zone, then change to oil base to drill into the horizon. Open hole up to 2,000 ft. has been maintained satisfactorily. A sacrifice in hole size is necessary unless the expense and time for underreaming or wall-scraping are deemed advisable.

Effect on Drilling Problems

The use of oil base multiplies the problems of drilling operations. Drilling crews have to have extra compensation, usually 75 cents per day per man. Fire hazard has to be guarded against with rigid rules. A large amount of time and material is spent on pump repairs, although the newer-type rubbers for pistons and valves will last longer than the older types up to 1,500 lb. circulating pressure, above which the usual amount of trouble is to be expected. It is often necessary to repair one pump while the other is in use, one pump being down continually.

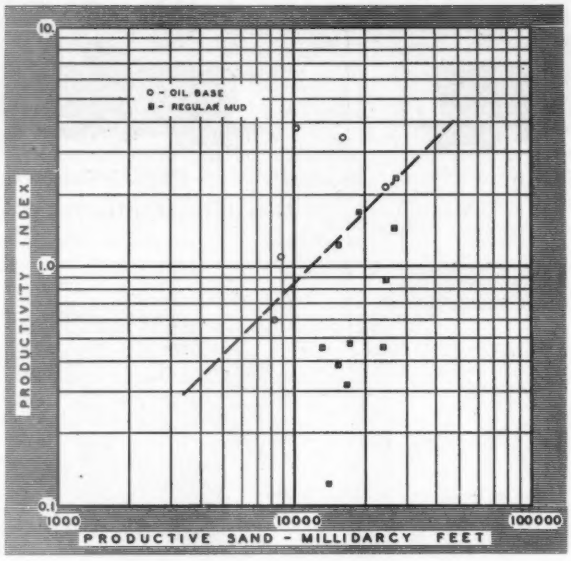
Since the cost of oil-base fluids is high, it is necessary to guard against losses. A wiper must be used on the drill pipe or tubing. The standback should have two drains, one to the ditch for oil and one outside for washing. Water-cooled draw works and steam engines should have special guards to prevent water getting into the cellar. Mud pits have to be protected from water drainage. Storage tanks are needed, especially where the operation is isolated from a central and mixing pit.

Use of oil base results in smaller hole sizes than where the zone is normally penetrated before any casing is run. Footage per bit is lowered due to the smaller sized drilling or coring heads. Experience also has shown that for the same size bit, shales will drill about the same as water-base muds, but sands will drill considerably harder and will take more bits to make the same footage.

All of the above has a decided effect on rig time, since all tend to increase the amount of time spent on the same length of hole.

The operator first using oil base is apt to experience considerable "growing pains" when handling oil base and should, if possible, use the experience of his neighbor to avoid unnecessary costs.

Oil-base costs vary from $5 to $10 per barrel for light-weight muds (68-75 lb.), and from $10 to $15 per barrel for heavy-weight muds (75-85 lb). Losses per hole in use vary from 50 to 150 bbl. with an average of around 100 bbl. Precautions outlined above will cut losses still further. The fluid may be used a number of times in different holes. Assuming that there is a loss of 100 bbl. per hole,



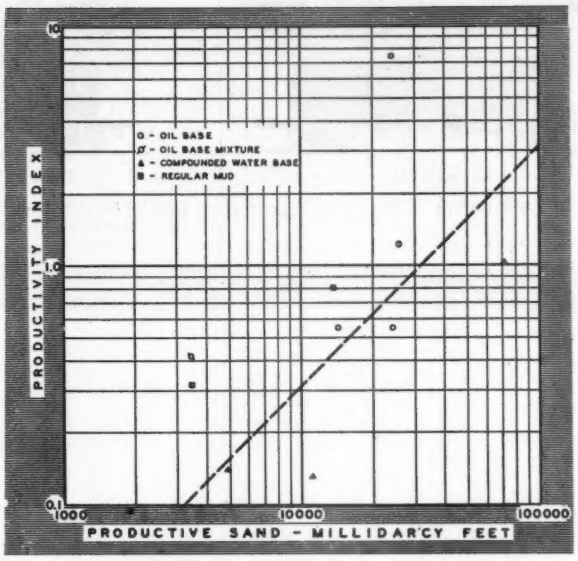


Fig. 5 — (Upper left) South central San Joaquin valley, Field "C," comparison of initial completions

Fig. 6—(Upper right) West side San Joaquin valley, Field "D," initial comparison

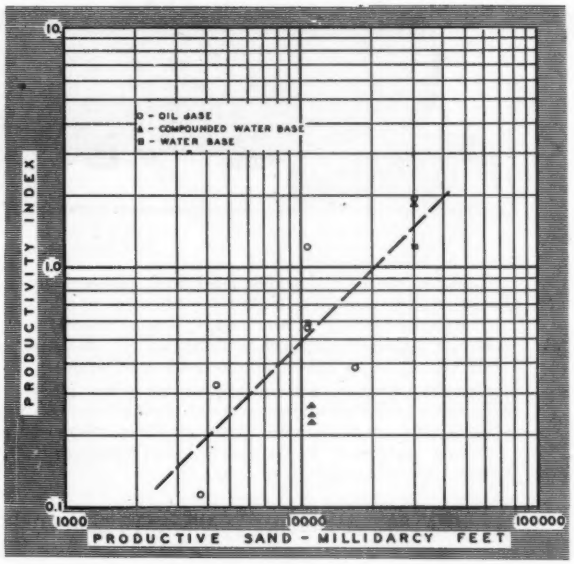


Fig. 7 — (Right) Harbor area, Los Angeles basin, Field "E," initial comparison

and a depreciation of one-eighth per hole of 400 bbl. fluid content, six holes may be completed with 1,000 bbl. of stock oil base. This spreads the cost considerably. Where operations permit, a central mud-storage and mixing plant is very desirable.

Effect on Completion Problems

Where the completion program can be made simple, as in drilling or coring the hole and setting a perforated liner, running tubing, and bringing the well in, the completion problem is not seriously affected except as to rig time and extra mud expense. If the program for completion involves intermediate waters and the necessity of cementing blank liners, or blank sections, an amount of extra time will be found necessary to complete.

Electric-logging equipment for oil base has been improved and it is now possible to make fair correlations on major breaks in the oil zone. It is not satisfactory for third curve work or for minor markers or for sand counts. There are instances of cores being badly flushed by oil base, making known analysis procedure and results uncertain. New experience factors and different methods may produce better results for this type of core. It is often advisable to test drilled or cored intervals to determine the proper fluid content.

Open-hole packer test work seems to be more positive with oil base than with water base. One company which makes open-hole interval tests as a part of completion practice, has not had a stuck packer which could not be jarred loose easily.

Obtaining satisfactory cement jobs in oil base is difficult without certain precautions. A quicker job is effected by running a hole caliper and figuring the amount needed therefrom and by preceding the cement with distillate. Since the oil base was installed to prevent water contamination to the oil zone, it is not good practice to precede the cement with water or water-base mud, although a more positive cement job would probably result.

Gun perforating does not present a problem. It can be done with as much ease as in water-base fluids. There is no known effect on scraping and wash work.

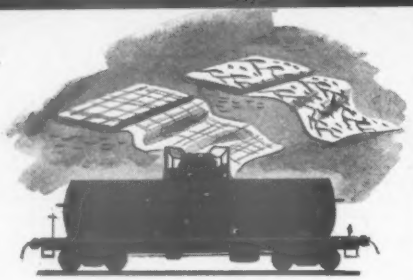
Experience has shown that considerable packer trouble is encountered in making casing tests of hole intervals. The light refined oils used in compounding the oil-base fluid attacks the packer rubbers and causes failure, or, the weighting material masks the slips to such an extent that a good hold is not obtained. Newer packer-ring designs and use of drillable bridge plugs have improved packer seals.

Effect on Drilling and Completion Costs

As shown above, the use of oil base can materially increase the cost of completing a well. Added shallow-hole cost is very small since it is difficult to find any difference in drilling and rig time. Cost per hole for shallow drilling will run from $2,000 to $3,000 per well for materials and handling. A deep hole of 10,000 ft. or deeper with 500 ft. of oil horizon will show considerable added rig time using oil base, as outlined previously, to make the same hole. Costs will likewise go up. As an example, assume heavy oil base required to hold down a well and 15 extra days' rig time to drill the 500 ft. of hole, run casing, gun perforate, and do the necessary cement work for secondary shutoffs. The heavy oil base will av-

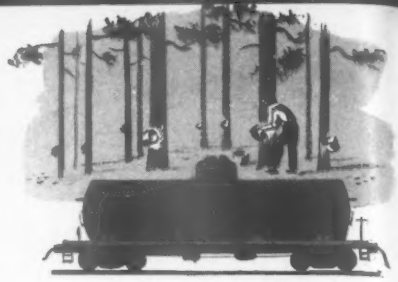
ALCOHOL

Clean, steel car, 6,000 to 10,000 gallon capacity.



CAUSTIC SODA

Heavily insulated steel car, with or without heater coils, 8,000 or 10,000 gallon capacity. Usually specially lined.

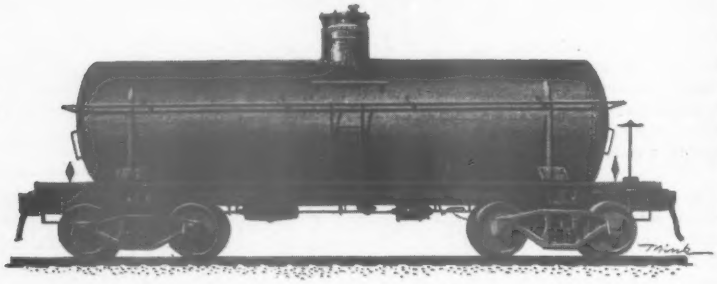


TURPENTINE

Clean steel car; 6,000 to 8,000 gallon capacity.

FOR RENT

TANK CARS



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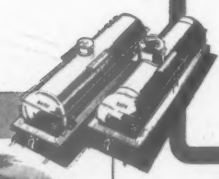

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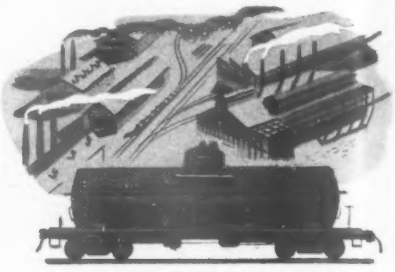
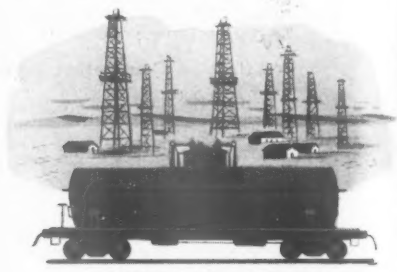


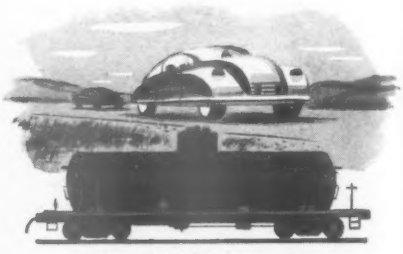
FUEL OIL

Steel car, steam coiled, 8,000 to 12,500 gallon capacity.



MURIATIC ACID

Car lined with pure or synthetic rubber; 8,000 to 10,000 gallon capacity.

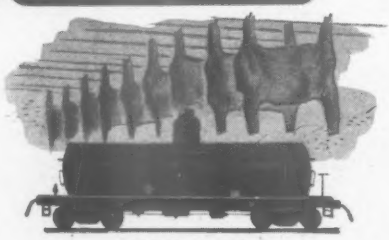


GASOLINE

Clean car, 6,000 to 12,500 gallons; single or multiple compartment

COCONUT OIL

an steel car, with steam coils, usually 8,000 gallon capacity.



TANNIC ACID

Equipped with brass coils and interior lined with a resinous, plastic or asphaltic material.

MOLASSES

Steam coiled car with heavy capacity trucks; 8,000 gallon capacity.

erage $13.50 per barrel to mix and maintain in usable shape. Since it was estimated previously that 1,000 bbl. would drill six holes, the cost per well would be $2,250. Fifteen days' extra rig time at $650 per day is $9,750. Extra tools and fuel are estimated to be $3,000. Total $15,000 or $30 per foot added cost due to use of oil base. Experience and improved technique in handling and use should reduce future costs.

Conclusions

The use of oil base appears to improve the initial ability of a well to produce oil. Inadequate history indicates that the improved position of the well productivity index is maintained.

Well-completion practices are improved. Swabbing, washing, and scratching are seldom necessary.

The effect of use of oil base on drilling operations tends, in general, to increase rig time. Precautions are necessary to prevent fires, water contamination, and unnecessary fluid losses.

The effect of oil base on completion problems is noticeable where the program calls for more than a drilled hole with a liner. Cement work on blank sections and squeeze work on gun perforations is not so easy as with water base.

The expenses of completion are usually increased from $3 per ft. on shallow holes to possibly $30 per ft. on deep holes where necessary secondary shutoffs are made. Improvements in technique and handling should reduce costs in the future.

The operator first using oil base is apt to experience excessive costs until his men are properly educated as to technique of handling and saving the oil base.

Spring-Forming Attachment for Lathes

HELICAL springs for emergency repairs may be made with the simple tools shown in the accompanying photograph. Practical limits for the tools described here run to a 2-in. i.d. by 6-A.w.g. spring at maximum to about ¼-in. by 24-gage for minimum sizes. Lengths for any of the sizes between maximum and minimum may be formed as desired up to several feet as the limit is established by the length of the forming bar.

Made of cold-rolled-steel shafting or of hot-rolled material the forming bar is threaded on a lathe in the same manner as a bolt with the exception that the threads are not cut as deep as in the case of a bolt. Thread pitch on the forming bar varies with the wire size or with the spring specifications as the case may be. Where specifications do not control or a spring is to be formed for replacing a factory-made item, the standard formula for extension and compression springs may be used to determine pitch for a given loading, length, wire size, and diameter. It is well to point out that springs made by this and similar methods seldom if ever meet the quality of a factory-made item; however, if maximum stresses are held to a relatively low figure the springs so formed will give very good service over long periods of operation.

Cold-coiled helical compression or extension springs are normally formed from carbon-steel spring wire which is available in several different grades. Stresses commonly run in the range of 80,000 to 90,000 psi. for nonshock or steady loads and 50,000 to 60,000 psi. for springs operating under impact loadings. These working stresses are used in designing a spring by the standard formula which makes no allowances for curvature correction. Where the Rover correction factor is used the above maximum stress figures are increased by 20 per cent. Allowable stress for brass wire is taken at 40 per cent of the foregoing figures and that for bronze at 50 per cent.

Extension springs formed by this

HILL – HUBBELL

machine applied STEEL PIPE PROTECTION

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V UNIFORM APPLICATION

Mechanically cleaned and primed steel pipe with conditioning of primer indoor controlled, guarantees positive bond: The enamel is applied over the primer in two separate applications to eliminate air bubbles and hollidays: Uniform specified thickness of primer and enamel thermostatically controlled at point of application over properly heated pipe at correct temperatures.

MOST MODERN PIPE PROTECTION PLANT

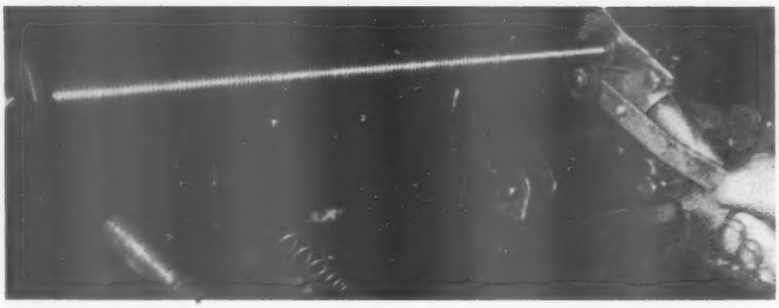
GENERAL PAINT CORPORATION
HILL, HUBBELL & CO. • Division • Cleveland, Ohio
• EXPORT OFFICE: SAN FRANCISCO, CALIFORNIA, U. S. A. •

method usually are given some initial tension during the coiling operation. When initial tension is applied in the forming of a spring the spring's actual extension may not be as great as its calculated extension.

The flat ends for compression springs are made by grinding and in some cases by forming but as a rule the grinding method of forming the flat ends is preferable. Most of the extension springs are formed with a loop or hook over the center of each of its ends and upon occasion other types of ends are formed when specified.

The feeder tool is made to allow for changing of the guide bushing which fits over the forming bar. The bushings are bored to a diameter that gives a free running fit on the spring's outside diameter. In the photograph the feeder tool is in position for starting a forming operation. The lever-and-wheel attachment on the left side of the feeder tool is for advancing the tool when the bar is rotated. The forward motion of the tool is brought about by the wheel at the end of the lever following along the bar's guide threads. Stopping of the forward motion is carried out by releasing the lever but if the bar rotation is not stopped the wire will continue to be pulled onto the bar although the follower wheel is disengaged. Dimensions for the feeder tool are not important beyond sufficient sizes of its various parts for strength. Several tools are desirable where the forming of a wide variety of springs is anticipated.

Each end of the forming bar is left plain so that one end may be easily chucked in a lathe and that the other end will afford ease in placing the feeder tool bushing into position and also allow space for a steady rest when needed. The free end of the rod is centered so that it may be steadied with a live center in the tail stock if preferred to a steady rest. (This idea is used at the Houston refinery of Sinclair Refining Co.)



Emergency repair springs of the coil or helical type may be quickly made to dimensional specifications with the aid of this simple tool

AMERICAN ROLLER BEARINGS of all types are built specifically to "bear up" under the terrific stresses and strains encountered in the world's most powerful industrial and oil country machinery. Their superior strength, long life and proven ability to render smooth, quiet, trouble-free service has made them favorites with heavy equipment manufacturers for more than 25 years.

Why don't *you* specify AMERICANS for your next *heavy-duty* application? Our engineers will gladly cooperate in solving all your roller bearing problems.

AMERICAN ROLLER BEARING COMPANY

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Pacific Coast Office: 1718 S. Flower St., Los Angeles, Calif.

AMERICAN *Heavy-Duty* ROLLER BEARINGS

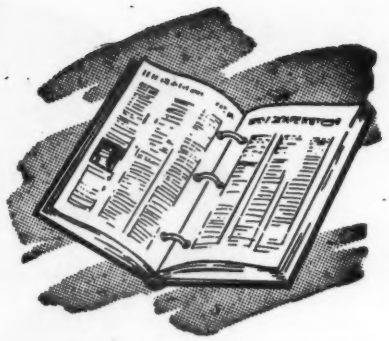
New Water-Drive Permits In North Texas

Railroad Commission of Texas has granted J. R. Gilbert permission to water flood the 1,300-ft. oil sand on his S. B. Daniels lease, Henry Hastie Survey, Abstract 99, Wichita County, Texas. Cable Oil Co. has been given water-flood permit for its Goldie Williams lease in Archer County, Texas. The water, coming from a 450-ft. sand, is to be used in conjunction with the Snider lease water-flood system located in Young County, Texas.

R. L. Dunsmore, formerly manager of the Montreal, Que., refinery for Imperial Oil, Ltd., has been appointed coordinator of refineries for International Petroleum Co., Ltd.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Surface Required for Exchangers

THE amount of surface required for an exchanger installation is dependent on the following main factors, and the factors are listed somewhat in the order of their importance:

1. Amount of material handled.
2. Difference between the temperatures of the two fluids.
3. Cleanliness of stock or stocks.
4. Viscosity of stocks.
5. Velocity of fluids.

There are, of course, other factors such as specific gravity, whether or not condensation takes place, size of tubes or passageway, conductivity of the tube material, etc., but most of these factors are altogether negligible compared to the ones listed above. These many factors are involved in the common mathematical relationship:

$$Q = H\,A\,\Delta T$$

in which:

Q = B.t.u. per hour
H = transfer rate, B.t.u. per sq. ft.-hr.
A = sq. ft. of area
ΔT = average temperature difference

The amount of material handled is most directly related to Q, which is defined as the B.t.u. transferred per hour. This has been discussed in The Refiner's Notebook No. 78 (January 26, 1946, page 299), Heat Duty of Exchangers, for both liquid-to-liquid and condensing exchangers.

Temperature difference between the two fluids has been discussed in several installments. How Big An Exchanger? (Notebook No. 71, page 111, December 8, 1945) shows what size of exchanger is most economical and the larger the temperature difference the more can be spent for an exchanger. Notebooks No. 73 (page 91, December 22, 1945) and No. 75 (Log Mean Temperature Difference, page 85, January 5, 1946) tell how to determine the average temperature differences between the two fluids (ΔT in the above equation). In multipass exchangers the full temperature difference may not be effective. This is discussed in Notebook No. 77 (Multipass Exchangers, page 99, January 19, 1946) and it should be noted that certain combinations of passes through the shell and passes through the tubes can result in a very low efficiency or even zero efficiency.

TENTATIVE SCHEDULE OF TOPICS

No. 86, March 23—Exchanger Tubes
No. 87, April 6—Standard Exchanger Tubing
No. 88, April 13—Coefficient of Expansion
No. 89, April 20—Velocity in Shells of Exchangers
No. 90, April 27—Surface Required in Exchangers
No. 91, May 4—Transfer Rates in Tubes
No. 92, May 11—Transfer Rates in Shell
No. 93, May 18—Viscosity Temperature Relation
No. 94, May 25—Fouling Factors—Crude Oil
No. 95, June 1—Fouling Factors—Oil Products

The performance and evaluation of products has been discussed in:

No. 29, Feb. 10, 1945—Six Topics Listed on Evaluation of Crude Oil
No. 44, June 2, 1945—A.S.T.M. and T.B.P. Curves
No. 58, Sept. 8, 1945—Kerosene and Its Stripping
No. 61, Sept. 29, 1945—Gasoline Performance
No. 63, Oct. 13, 1945—Lead Response of Straightrun Natural Gasoline
No. 65, Oct. 27, 1945—Lead Response of Desulfurized Gasoline
No. 67, Nov. 10, 1945—Lead Response of Cracked Gasoline
No. 72, Dec. 15, 1945—Evaluation of Diesel Fuels
No. 76, Jan. 12, 1946—Diesel Fuel Performance

The over-all transfer rate H in the above equation is dependent on several factors such as the kind of fluids being handled, whether or not condensation (or vaporization) takes place, the cleanliness of the fluids, and the velocity at which they flow past the heat-transfer surface. It is usually computed separately and then inserted in the equation stated above:

$$H = \frac{1}{\frac{1}{h_i} + \frac{1}{h_o} + R_i + R_o}$$

in which:

h_i = film-transfer rate for fluid in tubes, B.t.u./sq. ft.-hr.
R_i = fouling factor for inside tube surface
h_o = film-transfer rate for fluid outside tubes, B.t.u./sq. ft.-hr.
R_o = fouling factor for outside tube surface

Heat-transfer theory inserts other variables such as the thickness and conductivity of the tube wall, and the inside and outside diameters of the tubes, but the effects of these factors are usually small compared with the effect of other factors and particularly so because we cannot accurately foretell the degree of fouling or the film-transfer rates in commercial heat exchangers.

Fouling factors will be presented in Notebooks Nos. 94 and 95 for common plant situations. It should be emphasized now that fouling or dirtying of the heat transfer surface usually affects the over-all transfer rate more than any other variable. There are, of course, situations in which the fluids are very clean, and in such instances, fouling is of lesser significance.

Film-transfer rates as a function of velocity and viscosity will be presented in Notebooks Nos. 91 and 92. Specific gravity is of little significance for oils because it is a function of viscosity, but diameter of tube (or equivalent diameter of passageway) is important in determining the transfer rate of fluids on the outside of tubes.

No. 90 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

Drop-Forged Steel

FLANGES

by Harrisburg Steel Corporation

Harrisburg Drop-Forged Steel Flanges are noted for their strength, endurance and accuracy of machining. These flanges not only have a wealth of extra ruggedness but their threads are so carefully machined that they will stand any test as to fullness and uniformity. The threads of Harrisburg Flanges are perfect in height, angle, taper and gauging. A complete line of Harrisburg Flanges in standard type or for special purposes is available.

Harrisburg Seamless Steel Pipe Couplings are made to A. P. I. specifications.

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To make a high quality steel product, the steel itself must be right. That is why Harrisburg makes its own alloy, carbon and special steels. Our metallurgical department supervises the Open Hearth so that each heat of steel meets the specifications demanded by the engineering department for each particular product. Thus Harrisburg products are right from the start; right because supervision starts with the pig and ends only at the point of shipment.

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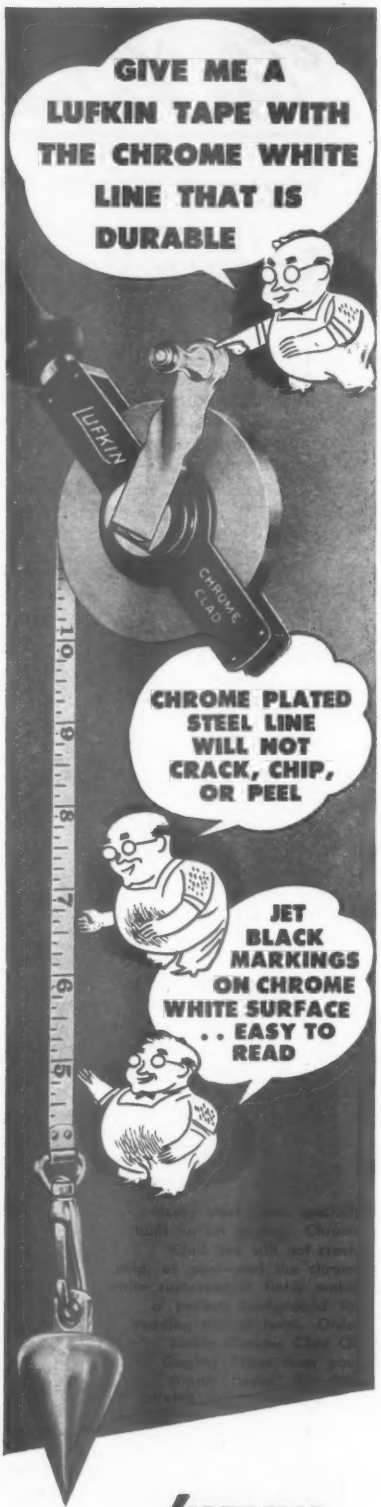
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Piercement Trap Reservoirs

This installment concludes a discussion of petroleum reservoirs and a method of classifying them which began February 23. The series was prepared by Dr. O. Wilhelm, of the production department of Shell Oil Co., Inc., and first appeared in the November 1945, A. A. P. G. Bulletin.

WHEN piercement of porous, permeable strata occurs, the beds are usually tilted up and faulted, resulting in the formation of many types of traps which in turn are responsible for a large variety of petroleum reservoirs. The effect of tectonic piercement is chiefly observed in piercement-type salt domes with plugs of rock salt and in diapiric anticlines with cores of plastic material, clay, or salt. Sometimes igneous plugs piercing sedimentary beds are involved in the accumulation of petroleum, for example, in the Sutter Buttes gas field in California on an uplift with a porphyry plug.

Piercement-Type Salt Domes

These reservoirs occur in beds abutting against a plug of impervious rock salt, or, in places, against a clay body which was pushed up from greater depth with the salt plug. Such clay masses may still be in some connection with the flanking beds and are then usually called "drag zones," or they may be completely disconnected sheets covering parts of the salt plug (Fig. 1).

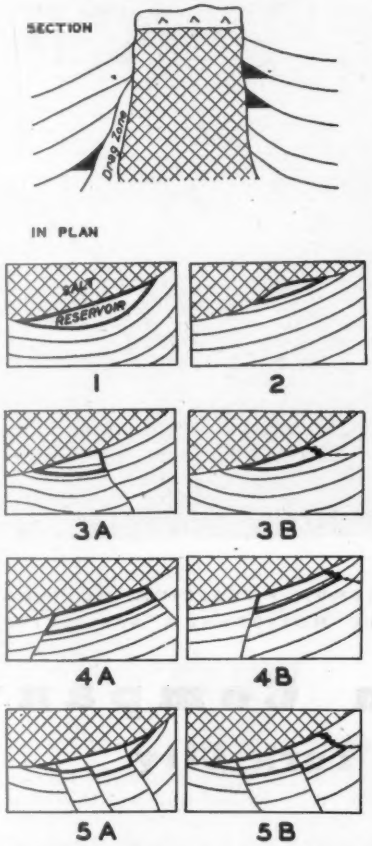


Fig. 1—Piercement trap reservoirs on shallow piercement-type salt domes

The structural configuration of the beds carrying the piercement trap reservoirs is partly due to uplift that took place prior to the actual stage of piercement. Not all salt cores are thrust through the exact center of the pre-existing uplift, and not all are vertical, or perfectly rounded on the outside. Consequently, most structural contours of the flanking beds are not parallel with the periphery of the salt plug, which is one of the principal factors to be considered in piercement traps. The other factors are radial faulting, a common feature of piercement domes, and local cementation, also referred to as mineralization, originating from solutions which were in contact with the salt core and cap rock. The cementing material is mainly calcite, anhydrite, marcasite, and pyrite.

The following subdivision of piercement trap reservoirs in piercement-type salt domes is derived from the foregoing points (Fig. 1).

1. **Crescent reservoirs.**—The trap is formed by structural closure of the flanking beds against the salt plug, for example, main reservoir in Anse La Butte, Louisiana.

2. **Salt niche reservoirs.**—The trap is formed by a recess in the side of the salt plug with the beds rising into this recess.

3. **Peripheral wedge reservoirs** (double traps).—(a) Oil trapped between the salt edge and a radial fault. (b) Oil trapped between the salt edge and a permeability barrier caused by local cementation of the reservoir bed.

4. **Peripheral segment reservoirs** (triple traps).—(a) Oil trapped between the salt edge and a pair of radial faults which are essential when the structural contours of the flanking beds are parallel with the periphery of the salt plug. (b) Oil trapped between the salt edge, a radial fault, and a permeability barrier due to local cementation.

5. **Composite piercement trap reservoirs.**—On account of the general occurrence of radial faults, many piercement trap reservoirs are of a composite type.

Diapiric Anticlines

The term "diapiric anticline" is applied to uplifts pierced by cores of plastic material squeezed up during the process of folding (Fig. 2). Trapping conditions, associated with diapiric cores are similar to those on piercement salt domes, being connected with structural closure against the piercement contact and with intersecting faults. More complicated diapiric folds are strongly faulted asymmetric uplifts with thrust faulting and normal faulting on opposite flanks, providing a variety of trapping conditions partly fault traps, partly piercement traps.

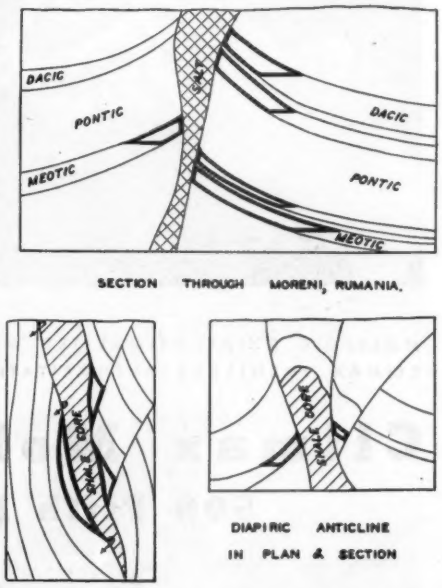
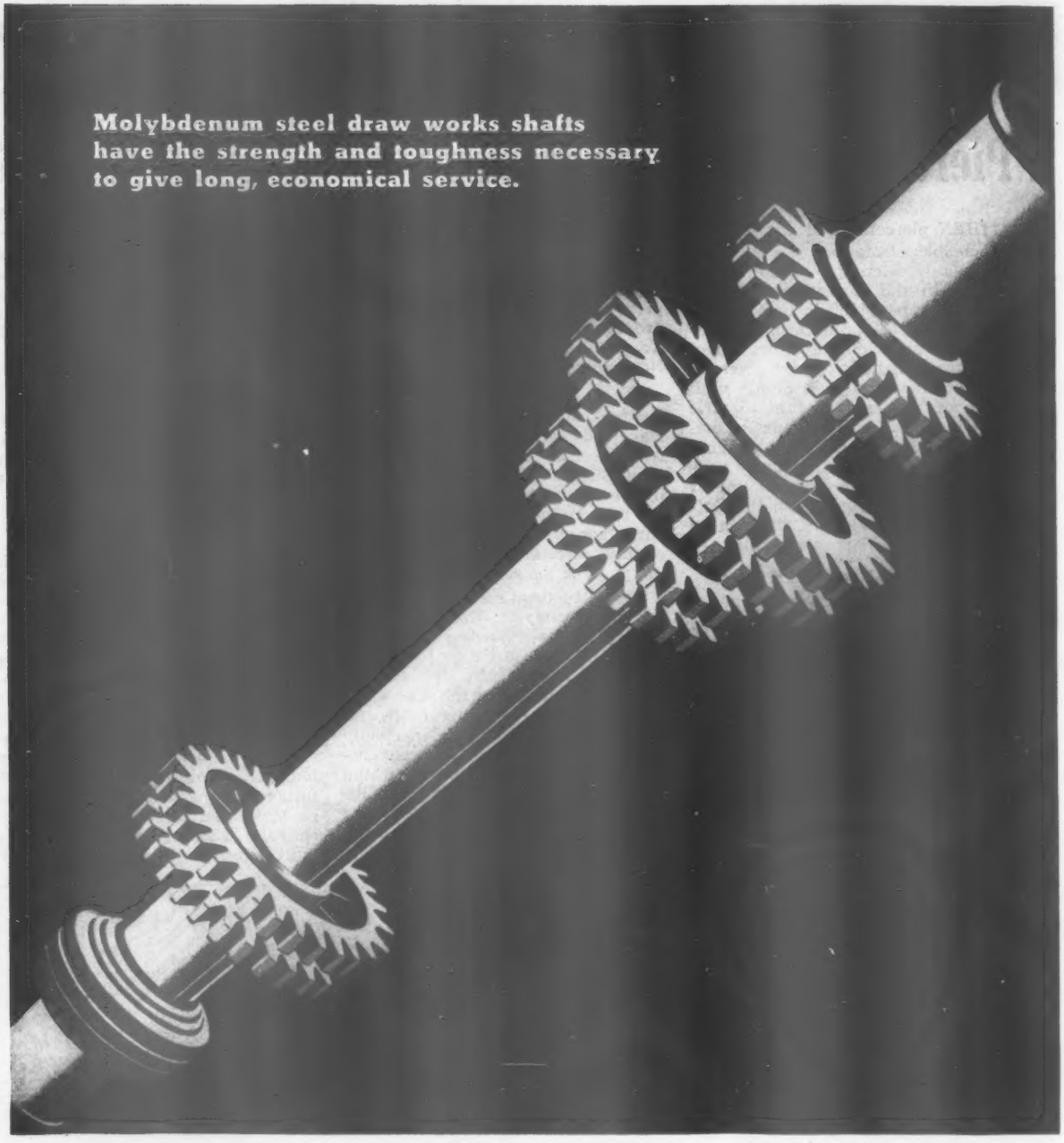


Fig. 2—Piercement trap reservoirs in diapiric anticlines

Series prepared by Dr. O. Wilhelm, Shell Oil Co., Inc. (A. A. P. G. Bulletin Vol. 29, No. 11)



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OIL AND GAS EQUIPMENT Digest

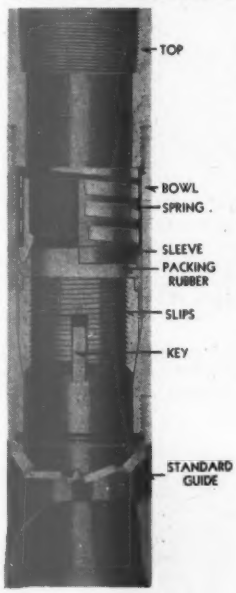
IT'S NEW CHECK IT

by Joe Cahill

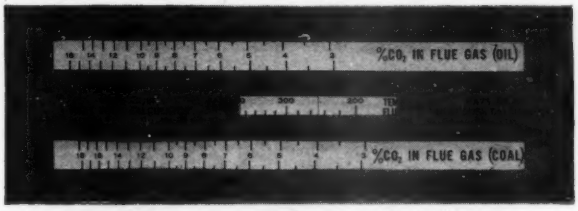
(1) AUTOMATIC, ADJUSTABLE, RATCHET - ACTION WRENCH provides thumb - trigger adjustment that keeps the jaws in constant grip on any nuts. Automatically ratchets for ¼, 1/6, ⅛, and 1/12 turn in close-quarter work. Available in V-groove and pipe-wrench teeth and three sizes to 1⅜ in. opening. *Oscar W. Hedstrom Corp.*

IT'S NEW CHECK IT

(2) NEW OVERSHOTS have recently been added to the "Slim Hole" type overshot. The more closely the tool-joint and drill-collar size approaches the inside diameter of the open hole and the tubing-collar size approaches the inside diameter of heavy weights of casing, the more need for a fishing tool flexible in design to the extent that new models can be created to suit. The new "SA" is 4-in. o.d. and is for fishing 2-in. tubing, upset, and couplings in 5-in. o.d. casing. The new "BE" is 9⅛ in. o.d. and is for fishing 6⅝-in. drill pipe and joints in 9½ to 9⅞-in. open hole. *American Iron & Machine Works Co.*



IT'S NEW CHECK IT



(3) FUEL-LOSS CALCULATOR. To be used after per cent of CO_2 from the flue gas, the temperature of the flue gas, and the room temperature have been determined. Figures on the calculator will reveal percentage of total heat loss from the flue gas. Handy little gadget, and it is being offered free. *Hays Corp.*

IT'S NEW CHECK IT

(4) THE SOUTHERNAIRE, designed and built as a corporation airplane, seats six people, carries 200 lb. of baggage, combines luxury with stability, speed, and cruising range. Custom interior provides reclining chairs, two desks, two-way radio, and complete instrument panel in passenger compartment. Powered by two 270-hp. Continental six-cylinder engines, the plane has top speed of 202.5 m.p.h. and cruises at 175.5 m.p.h. at 65 per cent power. Cruising radius is 760 miles. Retractable tricycle landing gear facilitates smooth take-offs and landings on rough fields. *Southern Aircraft Corp.*

IT'S NEW CHECK IT

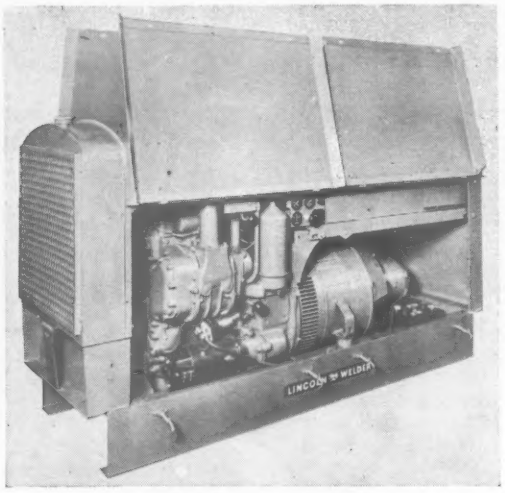
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

(5) NEW DIESEL-DRIVEN WELDER of 300-amp. capacity specially made for use in locations where electric power is not available or not economical. Equipped with dual continuous control, this welder permits the



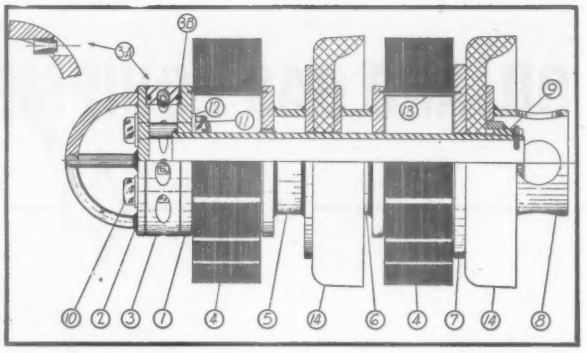
operator to select any type of arc and any arc intensity to suit the job. This feature improves the speed, quality, and ease of welding. Also, because of its fine adjustment, it makes possible a much wider range of application—both as to thickness and classes of metals and alloys. Other features of the welding generator include separate excitation and laminated magnetic circuit for a smoother, more productive arc at all current values. Can be truck or trailer mounted. *Lincoln Electric Co.*

IT'S NEW CHECK IT

(6) SELF-MOTIVATED SHALE SEPARATOR AND SAMPLE MACHINE has increased capacity to handle effectively flow of muds from largest mud pumps now in operation. Operates effectively on low pressures. Water jets relocated and number increased. Operates entirely from the flow of mud and is driven by V-belts and

gears, with all moving parts on ball bearings. Sample machine is standard equipment; mounted on the side of the separator, provides accurate samples of foot-by-foot cuttings. *Thompson Tool Co.*

IT'S NEW CHECK IT



(7) PIPE-LINE PIGS provide jet rotation by utilizing fluid pressure behind the scraper to force a bypass stream into the body and out through radial nozzles at the nose. This new design distributes wear on wire brushes and rubber cups for longer service life and greater economy in pipe-line cleaning. Available now in 8, 10, 12, and 16-in. sizes. *T. D. Williamson, Inc.*

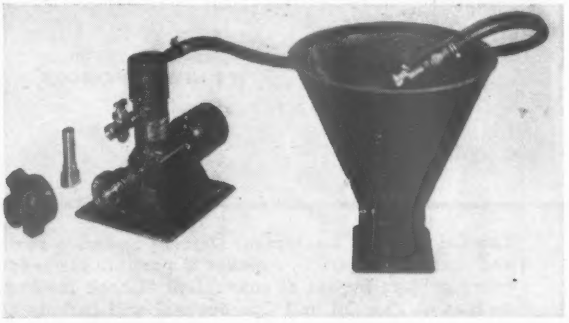
IT'S NEW CHECK IT

(8) TRACTOR SAW is self-propelled and goes anywhere under its own power. Saws trees and shrubs even

with the ground and is adjustable to cut up trees after sawing. One-man operation. It is available in chain or rotary style. *Little Giant Tree Feller Co.*

IT'S NEW CHECK IT

(9) "MUDERATOR" operates on vacuum principle, using pressure from the main circulating pump or from a stand-by pump. Dry mud is picked up from hopper

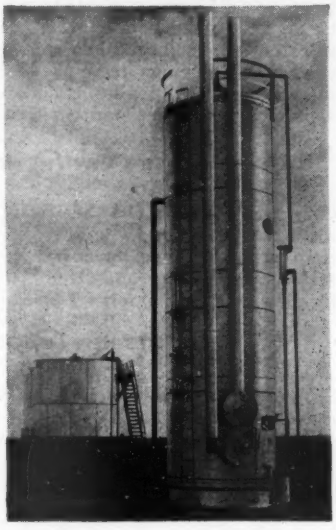


and fed into the line through a mixing chamber. Gives correct flow of uniform viscosity mud, saving dry ingredients and crew time as well as eliminating spilled

mud. Easily set up and adjusted. *Mid-Continent Supply Co.*

IT'S NEW CHECK IT

(10) SELF-INSULATING EMULSION TREATER features hot-water recycling system which preheats fluid in inlet line, liberation of excess gas from mixing compartment, advanced design of heating elements for more efficient use of fuel and elimination of hot spots and excessive scale deposits. Controls any tendency of fluid to foam. Adjustable oil settling height and salt-water bath. Available in three sizes, 4 ft., 6 in. by 28 ft. and heating capacity 300,000 B.t.u. per hour to 8 ft. by 28 ft. and heating capacity 1,000,000 B.t.u. per hour. All models operate at 25 psi. *The Parkersburg Rig & Reel Co.*

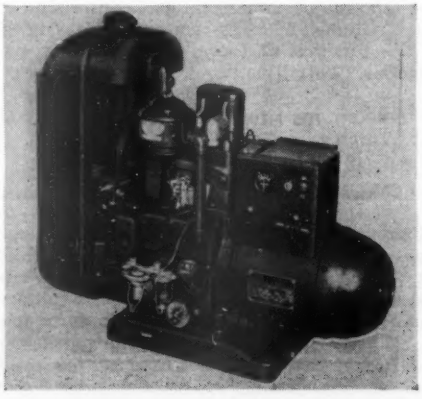


IT'S NEW CHECK IT

(11) REFILLABLE DRAFTSMAN'S PENCIL has new type of clutch which grips lead firmly and eliminates a great deal of breakage. Adjustable cap indicates degree of leads. *Charles Bruning Co., Inc.*

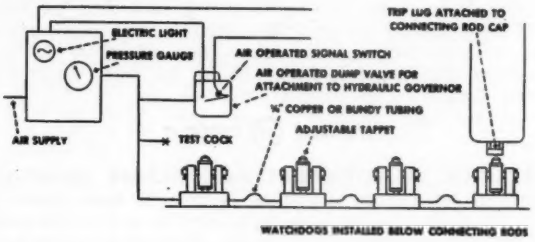
IT'S NEW CHECK IT

(12) COMBINATION VOLTAGE ELECTRIC-LIGHT PLANT produces both alternate and direct current simultaneously. Three thousand watts available to be used as 115-volt, 60-cycle alternating current with low charging rate to the 32-volt batteries, or a maximum of 750 watts of 32-volt direct current with the remainder in alternating current. The 32-volt batteries may be charged at the same time unit is furnishing alternating current for equipment in use. *Fairbanks, Morse & Co.*

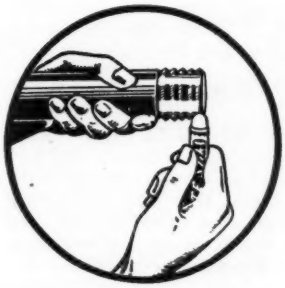


IT'S NEW CHECK IT

(13) BEARING WATCHDOG SYSTEM detects wear or shell out of connecting-rod and main bearings of a diesel engine. Trip lever installed in the crankcase provides point of contact to operate system. Other units include dump valve and control box. Operates either pneumatically or hydraulically. *Paxton Diesel Engineering Co.*


TRIP LUG ATTACHED TO CONNECTING ROD CAP
ELECTRIC LIGHT
PRESSURE GAUGE
AIR OPERATED SIGNAL SWITCH
AIR OPERATED DUMP VALVE FOR ATTACHMENT TO HYDRAULIC GOVERNOR
¼" COPPER OR BUNDY TUBING
AIR SUPPLY
TEST COCK
ADJUSTABLE TAPPET
WATCHDOGS INSTALLED BELOW CONNECTING RODS

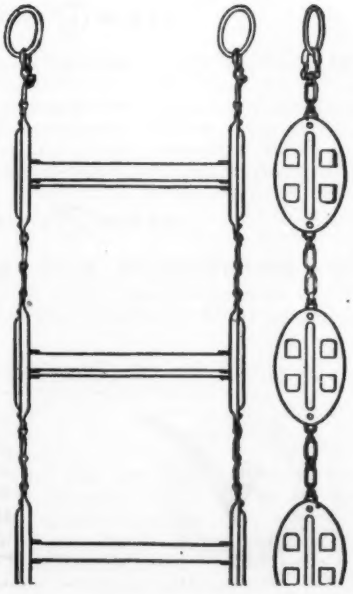
IT'S NEW CHECK IT



(14) PIPE-JOINT COMPOUND IN STICK FORM is handy, clean, and easy to use. Withstands gasoline, oil, butane, propane, acid, gas, sulfur dioxide, etc. Prevents rusting. *Lake Chemical Co.*

IT'S NEW CHECK IT

(15) CHAIN LADDERS originally designed for use aboard ships have now been converted to land uses. Extremely handy where insecure footing for rigid ladders is encountered, on jobs where work must be started at the top, in narrow passageways, ventilators, and tank interiors and exteriors. Constructed of aluminum, they are nonsparking, light in weight and easily adjustable for length. Rungs are solid ash. *American Chain Ladder Co., Inc.*



TRADE LITERATURE

(16) FOAMGLASS INSULATION. A well-written 24-page brochure presents a summary of the physical qualities of this product relative to its use in the petroleum industry. Typical specifications and details have been prepared by company engineers in collaboration with industrial applicators and conform with chemical process specifications. Practical suggestions are made for the use of this product. *Pittsburgh Corning Corp.*

IT'S NEW ✓ CHECK IT

(17) REFERENCE CHART ON ALLOY WELDING. A new reference chart on high and low-alloy welding electrodes includes tables on corrosion resistance, on heat resistance, and on weld metal surfacing, as well as the chemistry of the weld metal. Welding current and voltage table gives information of value to the operator. The chart is 20 by 30 in. for wall mounting. *Arcos Corp.*

IT'S NEW ✓ CHECK IT

(18) JACK MAINTENANCE AND REPAIR MANUAL. Users of lever and hydraulic jacks will find practical help on their maintenance and care in a new 48-page repair and maintenance catalog. Repair parts and a complete list of interchangeable parts are included. This book presents with suitable illustrations, valuable suggestions for maintenance, lubrication, and repair. *Templeton Kenly & Co.*

IT'S NEW ✓ CHECK IT

(19) AIR GAGING. A 32-page catalog of air-operated gages, showing applications and uses of air-velocity metering in precision gaging. Various types of gages and their applications are shown. *The Sheffield Corp.*

IT'S NEW ✓ CHECK IT

(20) SAFETY CONTROLS FOR ENGINES. A 16-page catalog, ring punched and multicolor printed, features pressure and temperature controls, oil-pressure controls, water-temperature controls, diesel fuel valves, bearing temperature controls, as well as line drawings showing construction details of each. Index chart for selection of controls is included. *Penn Electric Switch Co.*

IT'S NEW ✓ CHECK IT

(21) CENTRIFUGAL PUMPS. Ring punched broadside features full-size, multicolored cutaway drawing of two-stage, single suction centrifugal pump for boiler-feed and general service. Structural features are clearly shown in large-size illustration. Dimensions and specifications included. *American-Marsh Pumps, Inc.*

IT'S NEW ✓ CHECK IT

(22) CONSTRUCTION DATA AND HANDBOOK covers composition and uses of waterproofing, dampproofing, water treatment, and technical paints. Construction data and details and a "purpose" index are included in handy, pocket-size booklet. Tables of weights and measures for building materials are included. *A. C. Horn Co.*

IT'S NEW ✓ CHECK IT

(23) "CORROSION-RESISTANT MASONRY" is the title of a 56-page book, full of design details and useful information, including cements to use for different corrosives, impervious membranes, shell type for various membranes, how to build acid-proof floors and how to repair corrosion resistant masonry. *U. S. Stoneware Co.*

IT'S NEW ✓ CHECK IT

(24) NEW CATALOG SECTION OF HOSE FITTINGS, including couplings, joints, clamps, washers, nozzles, nipples, and flanges, features instructions for properly attaching couplings and other fittings which add to service life and hose safety. *The B. F. Goodrich Co.*

IT'S NEW ✓ CHECK IT

(25) PISTON-RING HANDBOOK FOR ENGINEERS is offered as a 140-page, cloth-bound handbook, covering a complete catalog of piston rings of all types, application, and service data. General engineering data and tables are included in 10-page section. Well illustrated in multicolor, it will offer a convenient reference for anyone interested in the purchase or maintenance of internal-combustion equipment. *Double Seal Ring Co.*

IT'S NEW ✓ CHECK IT

(26) TRAILERS AND TRUCK EQUIPMENT is a loose-leaf binder and sheets illustrating this line of transportation equipment. Oil-field truck bodies; self-loading semi's; tandem self-loading floats; pole and machinery trailers, both single and tandem, are pictured and described. Arranged so that additional sheets can be added from time to time. *Leland Equipment Co.*

IT'S NEW ✓ CHECK IT

(27) PLATE FABRICATION EQUIPMENT. Eight-page folder in two colors pictures plate fabrication equipment used in the oil industry. Bulletin shows scope and range of oil industry work which can be done. Describes gas absorbers, fractionating tower, heat exchangers, lined vessels, separator towers, stills, treaters, filters, tanks, tank cars, etc. *General American Transportation Corp.*

IT'S NEW ✓ CHECK IT

(28) RESET CONTROLLER. Sixteen-page technical descriptive bulletin illustrates and describes the five interchangeable major subassemblies comprising this instrument. Includes a cross-sectional drawing showing in color the function of these parts in the operation of the controller. Well illustrated. *American Meter Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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Natural Gas

Engineers to Survey Gas Waste in Old Ocean Field

AUSTIN, Tex. — Texas Railroad Commission engineers are scheduled to make gas-oil ratio tests and other investigations in the Old Ocean field of Brazoria County before the commission renews its hearings on casinghead gas wastage in the field May 18.

Operators in the field also are expected to show progress in their plans for conserving the gas at the May hearing. The commission heard testimony on the situation at an initial hearing here last week. Operators had been directed to appear to show cause why the field should not be shut down until arrangements are made to avoid flaring.

Producers told the commission at the hearing that 107 of the field's wells are returning the gas to the horizon, and that 35 are venting gas. Of the operators, Magnolia Petroleum Co. and A. S. Abercrombie were reported returning gas to the horizon.

Congressman Opposing Gas Invasion of Coal Markets

WASHINGTON. — In an effort to protect the coal industry's eastern markets, a Pennsylvania representative is seeking to block any sale of the Government's big-inch pipe line for use in transporting gas.

Representative Walter has asked War Assets Administration not to dispose of the lines for gas. He recently introduced a bill to prevent WAA from selling the carriers without Congressional approval. He said the lines, if converted to gas, would bring the cheap fuel to New York and other markets where coal is now dominant.

Southern Natural Gas Ordered to Cut Rates

WASHINGTON. — Applying the 6 per cent rate of return used in recent proceedings, the Federal Power Commission has ordered Southern Natural Gas Co. to lower its wholesale rates for natural gas sold in interstate commerce by approximately $1,000,000 annually.

The action culminates an investigation began several years ago into the company's charges. The reduced schedules are to become effective May 1. The commission placed the company's "total prudent investment rate base" as of December 31, 1944, at $36,671,627.

Gas Injection Approved For Southland Field

AUSTIN, Tex.—Gas injection to the upper and middle Cole sands in Southland field, Duval County, Texas, will be started by Hiawatha Oil & Gas Co. under a permit granted by the Texas Railroad Commission.

Such additional allowable gas from the Pettus sand as may be necessary to balance withdrawals from the Cole horizons also may be used. The gas input wells, 30 and 36 Southland Life Insurance Co., will receive oil allowables under certain qualifications, and permissible maximum producing gas-oil ratios will be computed on basis of net gas produced.

A.S.T.M. Group Devises Calorific Value Test

CLEVELAND.—A method of testing calorific value of gaseous fuels by the water-flow calorimeter has been prepared by a subcommittee of the American Society for Testing Materials and will be submitted to the society for adoption at its June meeting.

The subcommittee was organized under the society's Committee D-3 which has been working on standard test methods for use in connection with the purchase and sale of gaseous fuels. Each subgroup has a specific assignment on such projects as specific gravity measurement, calorific value, and moisture content. The subcommittee responsible for the new testing method is headed by R. S. Jessup of the National Bureau of Standards.

Gas Research Broadened

NEW YORK.—The American Gas Association's testing laboratories is extending its recently completed mixed gas research on interchangeability of other fuel gases with natural gases to include manufactured gas as base load. As a preliminary, representative manufactured gas companies will be surveyed to obtain information in actual operating problems encountered in mixing gases.

New Rate Plan Ordered for Southern Counties Gas Co.

SAN FRANCISCO. — Southern Counties Gas Co. has been ordered by the California Railroad Commission to institute a rate adjustment plan expected to bring further rate decreases beyond the present 7½ to 10 per cent discounts. Quarterly adjustments of rates on the basis of the preceding 12 months is required. Rates will be adjusted if these revenues differ by more than $50,000 from the criterion revenue set at $2,350,000.

Natural Gas to Be Used

CHICAGO.—Public Service Co. of Northern Illinois is planning to supply straight natural gas, instead of mixed gas as at present, to 37 suburbs north and northwest of Chicago if natural gas becomes available from the proposed new line of Natural Gas Pipeline Co. of America. Natural Gas Pipeline's application for the new construction is pending before the Federal Power Commission. The Illinois Commerce Commission has authorized Northern Illinois Public Service to supply straight natural gas to the communities.

Hugoton Scouts Organize

LIBERAL, Kans. — Sherrill Williams, Cities Service Oil Co., has been chosen chairman of the newly organized Southwestern Kansas Scout Association which is composed of scouting representatives in the Hugoton field. Secretary-treasurer is Neil Swink, Panhandle Eastern Pipe Line Co. The group held informal meetings nearly a year before organizing the association. Weekly sessions are now held here each Tuesday.

Pipe-Line Hearing Postponed

WASHINGTON.—At the request of the company, the Federal Power Commission has postponed indefinitely the hearing set for April 15 on the application of Metropolitan Eastern Corp. for authority to construct and operate an 825-mile, 18-in. natural-gas pipe line from Carthage field in Panola County, Texas, to the vicinity of Hamilton, Ohio.

Cycling Program Planned

JACKSON, Miss.—Although unitization of royalty owners is not yet complete, Gulf Refining Co. and California Co. are moving ahead with plans to carry out a $10,000,000 cycling program in the Cranfield pool in Adams County, Mississippi, according to reports here.

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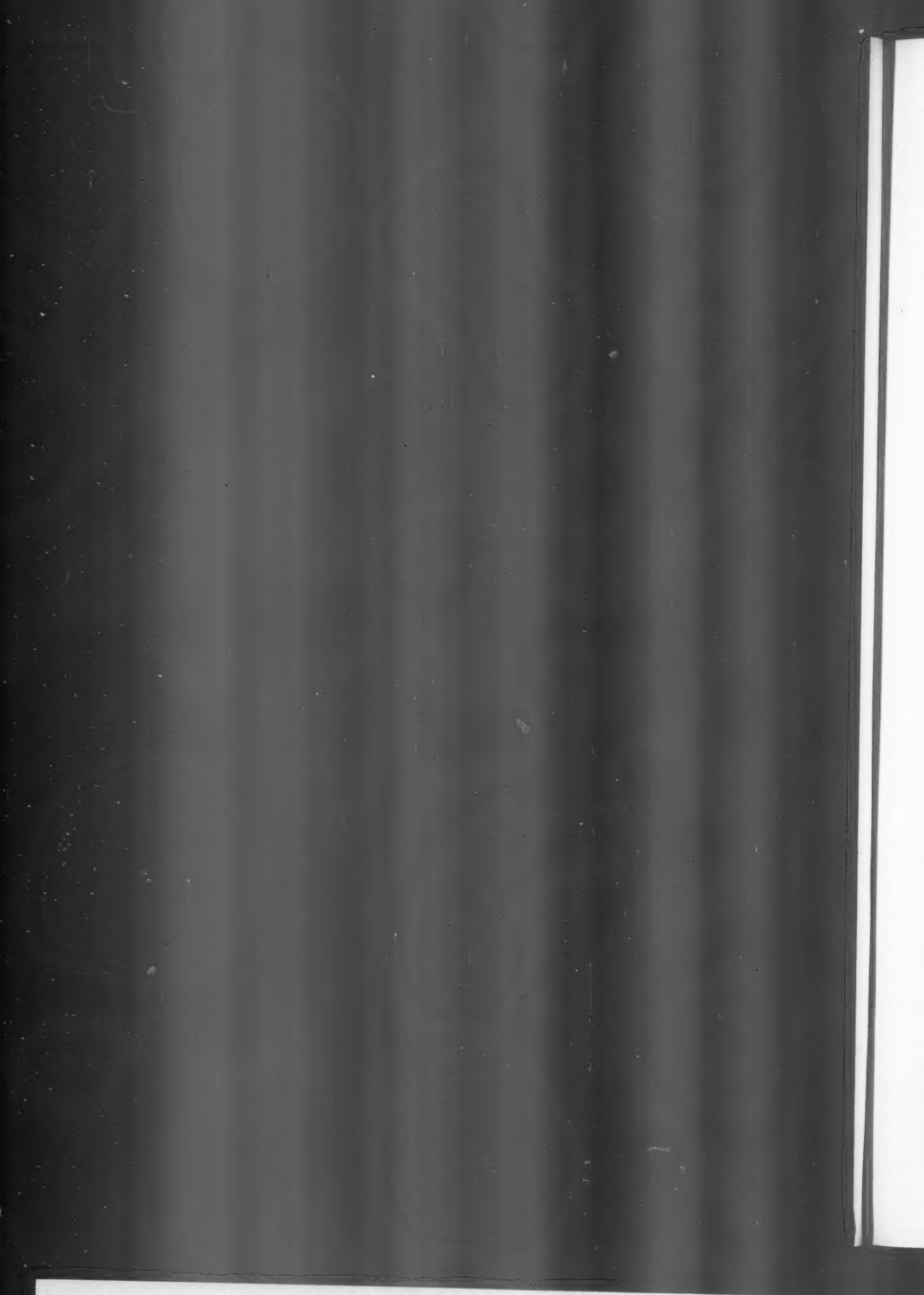

REFINING

General Petroleum's Plant Adds New Units

LOS ANGELES. — Expansion of General Petroleum Corp.'s refinery at Torrance, Calif., currently includes a delayed recycle coking unit and an Edeleanu sulfur dioxide treating unit. This postwar expansion follows the wartime addition of four thermal catalytic cracking units, according to a company announcement.

The coking plant is being built by M. W. Kellogg Co. and is expected to be completed by June. The installation includes two furnaces, four coking drums, and conventional fractionating facilities. Planned operation is for run of about 17,000 bbl. per stream day. Cost of coking unit and supplemental facilities will be upwards of $5,000,000. Yield of gasoline stock from the coking stock is anticipated to be from 18 to 20 per cent.

Engineering work for the Edeleanu unit has been completed and contract for construction awarded E. B. Badger & Sons Co. This work is expected to be completed late this year or in 1947. With facilities and services, the cost will be approximately $1,800,000. The unit will be devoted to manufacture of higher grades of diesel fuel, kerosene, and solvents.

Cracking Unit Completed At Mt. Vernon Refinery

INDIANAPOLIS. — A new Dubbs thermal cracking unit costing approximately $800,000 has been completed at the Mt. Vernon, Ind., refinery of Indiana Farm Bureau Cooperative Association.

The new unit was scheduled to go on stream early this week. Construction was by Refinery Engineering Co., Chicago. Added to the topping unit which has been operated at the plant the last 5 years, the new facilities complete a 4,000-bbl. plant of the latest type, according to J. Ivan Harris, manager of the association's petroleum department.

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New Process to Improve Octane Rating Reported

CHICAGO.—A new process named polytreating which improves the octane rating of catalytically cracked gasoline by removing undesirable olefins or by converting them to useful hydrocarbons has been announced by Universal Oil Products Co.

Described at the recent meeting of the American Chemical Society in Atlantic City, N. J., the process employs solid prosphoric acid as a catalyst. The possibilities of the new process were discussed in a report by Dr. Vladimir Haensel and V. N. Ipatieff, Universal Oil Products research chemists.

Four More Refining Plants Offered for Sale or Lease

WASHINGTON.—Four more refining properties have been placed on the market by War Assets Corp. The latest offerings bring to 22 the number of plants made available recently for sale or lease.

The four are: butane recovery and stabilization unit at Cyril, Okla., leased by Anderson-Prichard Refining Corp., rated capacity, 320 bbl. liquid butane daily; butane and butylene distillery at Denver, operated by Bay Petroleum Corp., capacity 126 bbl. daily; hydrogenation unit at Baton Rouge, La., operated by Louisiana division, Standard Oil Co. of New Jersey, rated capacity, 11,000 bbl. daily; aviation alkylate refinery at Smith's Bluff, Tex., rated capacity, 1,330 bbl. daily.

Wilcox's Bristow Refinery Reopens After Shutdown

BRISTOW, Okla. — After a shutdown of more than a month, Wilcox Oil & Gas Co.'s 5,000-bbl. daily capacity refinery here has resumed operations.

The plant was closed when storage filled and the market for gasoline

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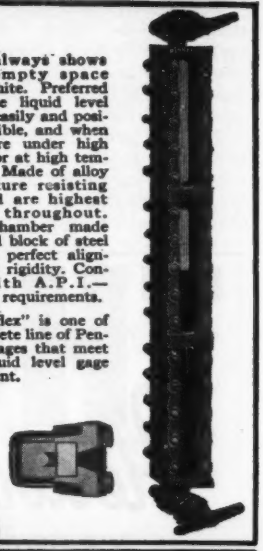

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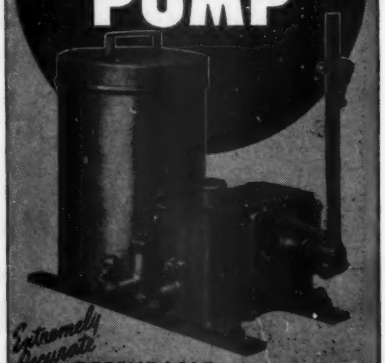

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was weak. The company took advantage of the situation to clean and overhaul equipment.

Changes in U. S. Gasoline Specifications Studied

WASHINGTON. — Several changes generally liberalizing federal gasoline and lubricating oil specifications have been recommended by the fuels and lubricants subcommittee of the Federal Specifications Board.

The recommendations have been presented to the 10 federal agencies which are represented on the board. It was considered possible several weeks would elapse before any definite action is taken. The changes recommended include: allowing additional oils for regular gasoline as solvents; permitting the sulfur content to be increased to 0.25 per cent; permitting gum at the point of manufacture with deletion required at the time of delivery; and reducing 74-octane regular gasoline to 72 octane because of the shortage of tetraethyl lead.

Imperial Plans Expansion Of Montreal, Sarnia Plants

TORONTO, Ont.—Plans for expansion by Imperial Oil, Ltd., have been announced. The company this year at its Montreal East refinery will begin construction of the first catalytic-cracking unit to be built in Canada and also of a 4,200-bbl. catalytic polymerization plant to convert petroleum gases into high octane gasolines.

Plans are also under way for construction of a polymerization plant at the Sarnia refinery and for equipment to increase wax production there. A large addition will be made to the research laboratories at Sarnia, and research facilities at Calgary will be expanded.

The loss of four large ocean-going tankers by enemy action during the war left the company with an ocean fleet of five tankers totaling 60,735 deadweight tons and a lake fleet of 13 vessels aggregating 31,838 deadweight tons. To meet pressing needs the company plans to purchase four of the wartime built tankers offered for sale by the U. S. Government. Negotiations for purchase of a British tanker for coastal use have been completed. In addition a program of construction in larger tankers is under consideration, and three lake-size tankers will be built in Canada.

Humble Buys Facilities

WASHINGTON. — Humble Oil & Refining Co. has purchased Government-owned facilities at the Baytown, Tex., plant it operated during the war to process aviation gasoline components. The $154,208 sale covered mechanical equipment comprising the Girbotol unit which includes the control house, cooling tower, water treating equipment, laboratory equipment, and miscellaneous lines, according to the War Assets Administration. Humble will use the facilities for the manufacture of various refined products for civilian use.

Crude Contract Signed

TYLER, Tex.—Production from wells of Bobby Manziel, Tyler operator, in Merigale field, Wood County, will be taken for the next 5 years by Talco Asphalt & Refining Co. under a contract recently completed. Talco Asphalt & Refining is to lay an additional 11 miles of line from Coke field to Merigale field in order to bring the crude into its system.

Globe Contracts for Crude

MIDLAND, Tex.—Globe Oil & Refining Co. has contracted to buy for its Lemont, Ill., refinery 5,000 bbl. of oil daily from leases of The Texas Co. in the Slaughter field of West Texas. The crude will be moved by Stanolind Pipe Line Co. to Drumright, Okla., and to Lemont by Texas Empire Pipe Line Co.

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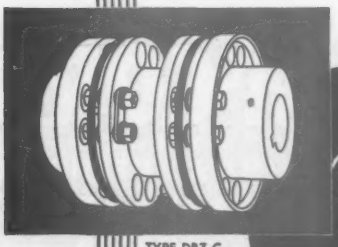

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PIPE LINES

Canadian Group Acquires Portland-Montreal Line

NEW YORK.—Four Canadian oil companies, British-American Oil Refining Co., Imperial Oil Ltd., McColl-Frontenac Oil Co., Ltd., and Shell Oil Co., Inc., have acquired all outstanding stock of Montreal Pipe Line Co., Ltd., which owns and operates a pipe line from the international boundary near North Troy, Vt., to Montreal East.

In addition, the companies, through a newly formed subsidiary, Portland Pipe Line Corp., have acquired all assets of Portland Pipe Line Co., which owns and operates a line from Portland, Me., to the international boundary where it connects with the line owned by the Montreal Pipe Line Co. The two lines provide a continuous system from Portland to Montreal.

The share interest in both these companies will be 40 per cent Imperial and 20 per cent for each of the other companies. The lines, which were acquired from the Standard Oil Co. (N. J.), were built during the war to serve tankers and have a capacity of about 60,000 bbl. per day and permit the continuous supply of crude to Montreal refineries on a year-round basis. The lines will continue to be operated as a common carrier system with the same personnel.

Stanolind Contracts for 203 Miles of New Lines

Construction work on 203 miles of crude oil pipe line is scheduled to start soon for Stanolind Pipe Line Co. in Missouri and Illinois.

The lines are generally along the route of existing lines and are designed to increase the capacity of the system. Between Manhattan station and Little Calumet Junction in Illinois, Sheehan Pipe Line Construction Co. will lay 30 miles of 18-in., 4½ miles of 14-in., and 20 miles of 8-in. line. In Missouri Oklahoma Contracting Co. of Dallas and Bechtel Brothers McCone Co., will lay 148 miles of 20-in. between the Freeman and LaPlata stations. An intermediate pumping station also will be built for Stanolind on a 12-in. line between LaPlata station and Wood River, Ill.

Phillips Laying More Hugoton Field Lines

GUYMON, Okla.—Phillips Petroleum Co. is making plans for extensions to its pipe line gathering system in the south part of the Hugoton field. A 20-in. line is being laid from a point 3 miles south of here to the main trunk near the Texas-Oklahoma line. Extensions to the gathering system are being made in Townships 1 and 2n and Ranges 14 and 15e. The company is preparing to begin a 50-well drilling campaign in the Guymon section of the field.

Seven West Texas Fields To Get Pipe Line Outlet

MIDLAND, Tex.—Seven producing areas in Crockett County, Texas, with a combined allowable of 2,800 bbl. daily will be connected to the 12-in. West Texas-Houston trunk of Texas-New Mexico Pipe Line Co.

The pipe line company is reported

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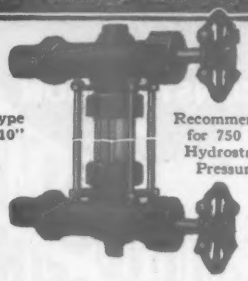

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to be planning to move the oil for the account of The Texas Co. Fields to be tied in, some of which are said to be now shut in on account of the lack of a market, are Olson, Clara Couch, Simpson, Shannon, Noelke, Hoover, and Live Oak.

Arabian American Officials Say Terminal Not Decided

NEW YORK. — Although Egyptian Government sources say the projected 1,200-mile crude pipe line from Saudi Arabia to the Mediterranean will terminate at an Egyptian port, Arabian American Oil Co. officials here told The Oil and Gas Journal that the exact location of the terminal has not yet been determined.

Maximum daily capacity of the line will be about 300,000 bbl. The exact capacity will depend on the number of pumping stations. A small delivery is anticipated when the line first goes into operation, probably some time in 1947. Trans-Arabian Pipe Line Co., an Arabian American subsidiary, will construct the line. Arabian American Oil is jointly owned by Standard Oil Co. of California and The Texas Co.

Pipe Line Company Revenue Drops 2.1 Per Cent in 1945

WASHINGTON. — Transportation revenues of 47 major pipe line companies in 1945 amounted to $284,203,108, representing a 2.1 per cent decline from the 1944 total, a survey by the Interstate Commerce Commission shows.

The number of barrels of oil originated on lines and received from connections totaled 2,205,801,085 bbl., a reduction of 1.3 per cent. Great Lakes Pipe Line Co. reported increases in revenue of 8 per cent and in volume of 9 per cent. Phillips Petroleum Co. reported increases of 6 per cent in both classifications.

Eucutta Line Being Laid

An 8-in. line is being laid by Interstate Oil Pipe Line Co. from Kiwanee in Wayne County, southeastern Mississippi, to Eucutta, 6 miles to the east, and from there to Heidelberg. The line, due to be completed by May 1, will allow crude from the Eucutta pool to be concentrated at the Heidelberg tank farm.

1945 Flow Change Slight

WASHINGTON.—Motor fuel turned into pipe lines in 1945 totaled 281,551,000 bbl., a slight decline from 1944's total of 283,052,000 bbl. Deliveries from lines, however, exceeded 1944, totaling 282,115,000 bbl. against 278,280,000 in 1944. Stocks in lines and working tanks at the end of 1945 totaled 10,603,000 bbl. as compared to 12,104,000 at the end of 1944.

The Bureau of Mines January 1946 report showed motor fuel deliveries by pipe line for that month little changed from December 1945, although dropping sharply from the January 1945 total. Fuel delivered from pipe lines in January 1946 amounted to 15,593,000 bbl. against 14,897,000 bbl. in December 1945, and 26,228,000 bbl. in January 1945. Stocks in lines and working tanks showed a further decline to 9,290,000 bbl. at the end of January 1946.

Surplus Pipe Line for Sale

DALLAS.—A 45-mile pipe line in the Texas Panhandle built to supply natural gas to carbon black plants, has been declared surplus and offered for sale or lease by the War Assets Administration. Formerly operated by Phillips Petroleum Co., the line consists of 22, 12, and 6-in. pipe and extends from the Rock Creek plant in Hutchinson County, Texas, to near Pampa, Tex., in Gray County.

Socony-Vacuum Buys Lines

BRADFORD, Pa.—All pipe lines, stations and tanks in the New York Transit Co.'s division here have been purchased by Socony - Vacuum Oil Co., Inc., and made a part of Socony - Vacuum's system supplying its Olean, N. Y., refinery. Field employes were continued with the same duties in Socony-Vacuum's organization.

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Exploration and Drilling

Hatteras Test Still Drilling

ALTHOUGH it has been publicly announced as probably dry, Standard Oil Co. (N. J.) 1 Esso, the Cape Hatteras wildcat on the East Coast, is still drilling ahead below 8,227 ft., and will probably be continued to the granite. After drilling stops, it is rumored the drilling rig will be stacked for a few months while additional geophysical and geological work is done. The original plans, according to reliable information, called for possibly as many as eight wildcats in this area.

This operation brings out some interesting points on how a modern, scientific exploration campaign is conducted in virgin territory. The objective is to get the maximum amount of information and interpretation out of each bit of work done, and to correlate all information from all sources into an over-all picture.

In this case, prior announcement of the estimated depth at which granite was expected, probably means a refraction seismograph profile was run from a known granite point to the present location. Or else that certain correlations of reflection work were possible which could determine the probable depth to granite. This gave the operator a close estimate of the thickness of sedimentary section in which he would have a chance of finding oil.

If, as is probable, reflection seismograph work was also done, since the geologic section was unknown, only a time-interval reflection map was obtained, which was reasonably accurate when interpreted geologically as reflecting general regional dips.

Logically the next step, when drilling stops, will be to obtain velocity measurements at various depths and for specific formations that might be good reflectors. This can be done by setting geophones in the well at intervals, anything from 100 to 500 ft. intervals, to the bottom, and also opposite specific marker formations.

When this velocity information is obtained, it can be applied to the seismic time-reflection data previously obtained, and make it possible to identify reflecting horizons geologically, and to determine accurately the depths of specific formations.

When the geologists assemble this new information and tie it in with the old, they will have many definite facts in place of theories. Now they have a known geologic section, and definite information on sedimentary conditions. Before, they had a picture of the regional attitude of the granite, and possibly picked the location because it seemed to be on a regional fold paralleling the Appalachian Mountains.

Now they can interpret their data in terms of depths of specific formations at any given point. They may be lucky enough to find that the available seismic data outlined a local structure. More likely they will find indications of a possible structure in an area requiring additional seismic detailing.

It will take some time to rework the time seismic records into geological formation depth and attitude data, and then additional time to correlate all the information, then still more time to do the added geophysical detailing that will be deemed desirable. Then they will be ready to pick the location for the second test.

EASTERN TEXAS

Travis Peak Wildcat Staked in Hunt County

DALLAS.—K. L. McHenry 1 Ida Williams, J. E. Clark Survey, is a new Travis Peak wildcat for Hunt County, 4 miles southeast of Caddo Mills. Description is given as beginning at the southwest corner of the survey, thence northwest along the southwest line 3,015 ft., thence northeast at right angles 389 ft. to location. Drilling is to be started at once. Another new Travis Peak wildcat is the Rogers Lacy 1 E. Key, Sr., to be drilled on a 503-acre tract in the S. G. Alexander Survey, 15 miles south of Marshall in south central Harrison County. The wildcat is on the northwest flank of the Carthage gas field and will be drilled for oil production.

Magnolia Petroleum Co. and Seaboard Oil Co. 1 Orr, Fowler Survey, Marion County discovery 3 miles southwest of Avinger, swabbed down to 4,000 ft. from the surface for 5 hours and flowed at the rate of 8 bbl. of fluid per hour. The well was left open overnight and flowed 101 bbl. fluid in 12 hours, 70 per cent 34.5°-gravity oil. There was a slight increase in gas. Humble Oil & Refining Co. 1 Freeman, Little Survey, wildcat in the Brushy Creek sector of northeastern Anderson County, was drilling below 12,090 ft. in lime and shale. Humble has staked an offset to its recent Pettit lime discovery in the Huxley pool of eastern Shelby County. It is 2 Pickering Lumber Co., 2,300 ft. from the most northern line and 1,250 ft. from the most eastern line of the W. D. Woodfin Survey.

East Texas field, Gregg County, had six completions this week and Hawkins field, Wood County, five. Carthage field, Panola County, had five locations and Hawkins four. Carthage field has 32 drilling wells; Hawkins field, 22; New Hope field, Franklin County, 7; Sand Flat field, Smith County, 5, and Waskom, Harrison County, 4.

EASTERN TEXAS WILDCAT FAILURE

Kaufman County: O. W. Killam 1 J. W. Nalls, J. E. Roof Sur., 5 mi. E Kaufman, elev. 511 ft., Woodbine 3,244 ft., dry, TD 3,445 ft.

N. CENTRAL TEXAS

Second 10,000-Ft. Test Started

WICHITA FALLS.—Denver Producing & Refining Co. 1 Jewell, Block 15, William Allen Survey, prospective Simpson sand oil discovery in northwestern Grayson County, 6 miles southeast of Gordonville, has been abandoned after tubing became cemented in the hole during a squeezing operation. It was plugged back to 8,717 ft., from total depth of 9,413 ft. in the Ellenburger, to test the Oil Creek sand of the Simpson. The company has already started drilling on another 10,000-ft. wildcat 7½ miles northwest of Gordonville. It is 1 Rich, in the I&GN Survey. Standard Oil Co. of Texas 1 Mitchell, J. B. McNair Survey, wildcat 2 miles north of Sherman in northern Grayson County, was drilling below 7,965 ft. in sand and shale.

L. T. Burns 2 Sanzenbacher, L. N. Sparks Survey, southern Clay County wildcat 4½ miles southeast of Blue Grove, was drilling below 5,424 ft. in shale. Cities Service Oil Co. 1 Mulkey, Section 163, Block 44, H&TC Survey, Ellenburger wildcat 2 miles south of Truscott, Knox County, was drilling below 5,666 ft. in shale. Seaboard Oil Co. and Shamrock Oil & Gas Corp. 1 Speck, Section 25, Block 44, H&TC Survey, Foard County wildcat 6 miles northwest of Foard City, was drilling below 5,733 ft. in lime.

Electra field, Wichita County, had six completions this week: KMA field, Wichita County, five; and Gatewood field, Cooke County, and Sunshine Hill field, Wichita County, two each. Electra field had nine locations; Holliday field, Archer County, four, and Gatewood, Wilson and Muenster fields, Cooke County, two each. Gatewood field has nine drilling wells; Sivells Bend field, Cooke County, eight; Cooper field, Archer County, and Hildreth field, Montague County, six each, and National field, Wilbarger County, and Knox field, Young County, five each.

In West Central Texas, Ingram field, Taylor County, had one completion; also Overall and Santa Anna fields, Coleman County, and Jones County Regular field.

Shackelford County Regular field had two locations, and Bluff Creek, Shackelford County, and Cooper field, Jones County, each had one. Stephens County Regular field has six drilling wells; Loving field, Stephenes County, Reddin field, Taylor County, and Palo Pinto Regular field each had two.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT

Wilbarger County: New oil pay—National Assoc. 1 A. C. Smith et al, Sec. 30, Blk. 13, H&TC Sur., National pool, elev. 1,221 ft., flowed 242 bbl. day through ¼-in. choke on 2-in. tubing, top of pay 3,663 ft., Rock Crossing 3,658 ft., gravity 38, gas-oil ratio 300 to 1, TD 3,675 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Baroque Oil Co. 1 A. L. Harris, Lot 58, Jno. W. Harris Club Ranch Subd., 7½ mi. W and 2 mi. S. Archer City, dry, TD 1,425 ft.

G. W. Cooper et al 1 Ben Jones, Thos. Freeman Sur. A-134, 2 mi. S and 1 mi. W Holliday, elev. 1,035 ft., dry, TD 5,036 ft.

Cooke County: Trumter Oil Co. 1 A. Judy J. Clark Sur., 5 mi. N and 1 mi. E Muenster, elev. 1,048 ft., dry, TD 1,360 ft.

Denton County: Leland Fikes 1 G. W. Phillips, Sec. 35, T&P Sur. A-1674, ½ mi. W and ¾ mi. S. Aubrey, elev. 709 ft., Caddo 2,441 ft., dry, TD 3,007 ft.

Jack County: Hanlon-Buchanan 1 J. V. Powers, W. L. Hunter Sur. A-966. 5½ mi. S and 3½ mi. E Antelope, dry, TD 750 ft.

King County: Superior Oil Co. 2 Pitchfork Land & Cattle Co., Sec. 171, Jno. H. Gibson Sur. A-96, 14 mi. N and 4 mi. E of SW corner of county, elev. 2,024 ft., Mississippian 6,405 ft., Hickory 6,970 ft., granite 7,043 ft., dry, TD 7,045 ft.

Montague County: Grady T. Chupp 1 Arch Durham, W. J. Wagnon Sur. A-936, 2 mi. E and 4 mi. N Bonita, granite 4,113 ft., dry, TD 4,116 ft.

Wichita County: D. H. Bolin 1-B H. C. Obenhaus, Mary Ann Bush Sur. A-24, 6½ mi. E and 5 mi. N Electra, dry, TD 2,028 ft.

Consolidated Oil Co. 1-A J. T. Harrell Est., Leag. 2, Denton CSL, elev. 1,034 ft. KMA 4,162 ft., dry, TD 4,465 ft.

Wilbarger County: Norwood & Smiley 1 H. M. Tarlton, Waggoner Colony Subd., 2½ mi. E and 6 mi. N Harrold, elev. 1,118 ft., dry, TD 2,018 ft.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT

Jones County: New oil pay—S. B. Roberts 7 O. J. Cooper, Sec. 29, Blk. 15, T&P Sur., Cooper-Roberts field, elev. 1,703 ft., IP 231 bbl. day through open 2-in. tubing, perf. 2,186-90 ft. Swastika, gravity 40°, TD 2,340 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Parker County: Continental Oil Co. 1 C. P. Woody, D. H. Deal Sur. A-2104, 1 mi. S and ¼ mi. W Poolville, elev. 1,342 ft., Ellenburger 6,114 ft., dry, TD 6,547 ft.

Shackelford County: R. S. Miesse 1 Betram A. Elliott, Sec. 46, BOA Sur., 2 mi. SE Sedgwick, elev. 1,305 ft., dry, TD 754 ft.

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MAGNOLIA BEARING METALS

SOUTHWEST TEXAS

Atascosa County Oil Discovery Completed

CORPUS CHRISTI.—Oil discovery for the area 1 mile southwest of Jourdanton, in Atascosa County, Humble Oil & Refining Co. 1 Moursund has been completed for an initial pumping gage of 37 bbl. of net oil per day plus 30 per cent wash water, still being cleaned, and with 49,750 cu. ft. gas per day. Gas-oil ratio 1,344 to 1. Total depth is 7,385 ft. in Edwards lime topped at 7,362 ft. and with 5½-in. casing set on top of the Edwards.

A new deeper pay is being opened in the Gaffney field, Victoria County, by Weigand Bros. and Ralph E. Fair 1 Mrs. Etta Terrell, which has tested oil with high gas-oil ratio on drill-stem test in the Vicksburg. Two drill-stem tests in the 5,100-ft. Frio sand were attempted but failed to get a test because of packer failure, and since the sand did not look very good, the well was drilled ahead to the Vicksburg to total depth 5,605 ft. Tested salt water at 5,596-605 ft., set 5½-in. casing at 5,551 ft., and perforated the new sand at 5,458-64 ft. and on 5-minute drill-stem test developed 1,880 lb. working pressure and recovered 265 ft. of 37° gravity oil. Operators squeezed and reperforated the 5,300-ft. Vicksburg gas sand at 5,360-64 ft., and on 10-minute drill-stem test developed 2,000 lb. working pressure, 2,500 lb. bottom-hole pressure. Drill-stem test in open hole before setting pipe had also shown for gas production at 5,318-30 ft.

David S. Ring and Raymond I. Arsht 2 Joe Matthews, wildcat 6 miles west of La Pryor in Zavala County, reperforated at 2,196-2,215 ft. with 130 shots and squeezed in 1,000 gal. of kerosene in an effort to loosen the heavy asphaltic oil shown on cores in the Olmos sand at that depth. The well was then swabbed, and recovered kerosene and asphalt. Total depth is 2,230 ft. with 7-in. casing set on bottom. Operators are still testing.

The 29 new locations reported this week include 13 wildcat starts, 2 in McMullen and 2 in Webb counties, with 1 each in Bastrop, Bee, Caldwell, Duval, Jim Hogg, Jim Wells, Milam, San Patricio, and Wil-

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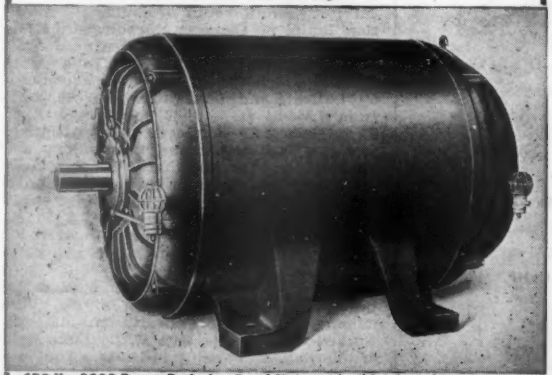

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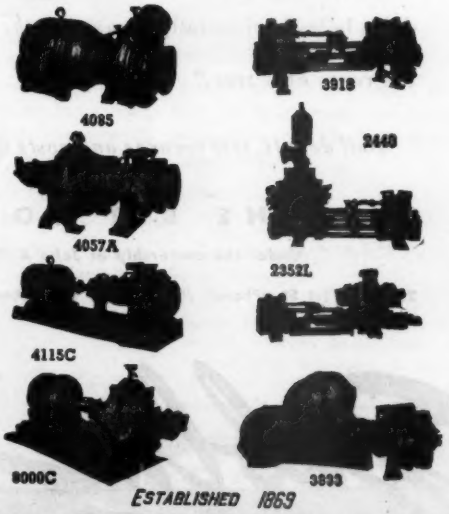

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son counties. There were seven dry wildcats completed, three in Webb, and one each in Brooks, Jim Hogg, McMullen, and Starr counties. Refugio County showed the greatest activity receiving seven completions, Duval County was next with six, and Webb County received four.

SOUTHWEST TEXAS WILDCAT FAILURES

Brooks County: La Gloria Corp. 1 C. F. Wagenschein, CCSD&RGNG Sur. 22, Abst. 659, 12 mi. SW of Falfurrias, dry, TD 8,503 ft.

Jim Hogg County: Killam-McLean 1 R. Holbein, Las Animas Grant, Abst. 244, 12 mi. SE of Mirando City, dry, TD 3,567 ft.

McMullen County: Santa Clara Oil Co. et al 2-A Volney M. Brown et al, dry, TD 864 ft.

Starr County: Baliridge & King 1 I. Y. Garcia et al, Porcion 190, 2 mi. NW of Sullivan City, dry, TD 4,301 ft.

Webb County: Houston Oil Co. of Texas 1 Rosa Benavides et al, GC&SF Survey 411, 3 mi. NW of Bruni, dry, TD 3,603 ft.

The Texas Co. 1 Daniel Adami, H&GN Sur. 4, 4 mi. SW of Adami field, dry, TD 1,096 ft.

Geo. Buck and J. N. Abel 1 J. G. Garcia Est., Survey 592, 1 mi. E of Mirando City, dry, TD 1,908 ft.

SOUTH LOUISIANA

New Gas Pool Opened In Johnson Bayou Area

NEW ORLEANS.—A new gas pool has been opened in Johnson Bayou area of Cameron Parish by Continental Oil Co. and Sohio Petroleum Co. 1 Cameron Parish School Board, 16-15s-14w. Well is now shut in after making an initial flow of 4.60 bbl. daily through a 3/16-in. choke, along with 1,340,000 cu. ft. of gas with 2,175 lb. flowing pressure on tubing. Gas-condensate ratio 400,000 to 1. Production was through perforations at 7,312-7,316 ft. Hole bottomed at 9,302 ft. and after an unsuccessful test through perforations at 9,196-9,210 ft. where the well flowed salt water with 2,300 lb. pressure, it was plugged back and perforated for a test at .7,312-16 ft. where it now is shut in as a gas well.

Magnolia Petroleum Co. and Humble Oil & Refining Co. 43, Cameron Meadows wildcat test ¾ mile south of southern production limits at Cameron Meadows field, in Cameron Parish, has been given a potential flow from a new sand level. Total depth is 7,638 ft. with 5½-in. casing cemented on bottom, and perforated with 48 shots from 7,556-64 ft. and 48 shots from 7,582-90 ft. On a drill-stem test the well showed for gas and condensate production, and after tubing was run to 7,503 ft., the well made an initial gage of 40 bbl. of condensate, 49° gravity, through an 8/64-in. choke with 3,300 lb. flowing pressure, 3,400 lb. shut in, and gas-condensate ratio of 14,575 to 1, gaging 583,000 cu. ft. of gas daily through a ½-in. choke.

A new oil pay has been opened by Union Oil Co. of California at 2-A Vermilion Parish School Board, an old well worked over, in the East White Lake field of Vermilion Parish, 16-15s-1e. The old perforations at 10,042-50 ft. and 10,055-58 ft. were squeezed and hole plugged back to 9,962 ft. On drill-stem test through new perforations at 9,906-28 ft., it flowed 145 bbl. of pipe-line oil daily through ¼-in. and ⅛-in. chokes with a gas-oil ratio of 5,635 to 1. On production gage through 60 perforations at 9,918-28 ft. it flowed 108 bbl. of pipe-line oil daily through a ⅛-in. choke, 2,125 lb. flowing pressure, and gas-oil ratio of 3,977 to 1. Gravity is 36°

All eight new locations reported this week are in proven areas with Calcasieu Parish receiving three, St. Martin Parish

two, and one each for Beauregard, Cameron, and LaFourche parishes. Two new oil sands were opened, one in Calcasieu Parish and one in St. Mary Parish. Livingston and Plaquemines parishes each received one dry wildcat. Calcasieu, Jefferson, and St. Mary parishes received the most activity, reporting two completions each.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Calcasieu Parish: New oil sand Iowa field—Shell Oil Co., Inc., 35 F. Heyd, NE 13-9s-7w, TD 5,262 ft. Top of oil sand 5,174-93 ft., perf. 45 holes 5,180-88 ft., PT 162 bbl. 24 hours through 9/64-in. choke, gas-oil ratio 5,052 to 1, 728,000 cu. ft. gas per day, TP 1,400 lb., CP 2,000 lb., gravity 34°, no water.

St. Mary Parish: New oil sand Charenton field—Lynn Oil Co. 2 Hine Estate, 31-13s-10e, TD 7,004 ft., top oil sand 6,458-6,505 ft., perf. 60 holes 6,480-90 ft., PT 150 bbl. 24 hours through 9/64-in. choke, gas-oil ratio 700 to 1, TP 1,100 lb., gravity 38°, no water.

SOUTH LOUISIANA WILDCAT FAILURES

Livingston Parish: A. J. Bankhead and Danciger Oil & Refg. Co. 1 E. L. Hood, Denham Springs area, 37-7s-3e, dry, TD 9,504 ft.

Plaquemines Parish: Gulf Refg. Co. 1 Eugene De Armas et al, 57-20s-18e, dry, TD 13,035 ft.

TEXAS GULF COAST

Biggest Gasser Running Heavier Tubing

HOUSTON.—McCarthy Oil & Gas Corp. 1 Holland et al, reported to be the world's biggest gasser, in the Blue Lake pool of Brazoria County, John Bradley Survey, is running new and heavier tubing after squeezing off the perforations to kill the well. First reported gage estimated an open flow of 300,000,000 cu. ft. of gas. Pressure was over 8,000 psi. and the well was reported making an ungaged volume of condensate. New gas production is from the Basal Frio formation in sands from 10,980-11,035 ft. with flow through eight perforations at 11,012-14 ft. Total depth is 11,397 ft. The 5½-in. casing is set at 11,046 ft. Production test was on a 13/64-in. choke registering 7,100 lb. working pressure. Gas volume was 7,165,000 cu. ft. Test on 16/64-in. choke showed volume of 10,850,000 cu. ft. at 7,000 lb. working pressure. The estimated bottom-hole pressure was 8,796 lb. This well is equipped with 15,000-psi. christmas tree.

McCarthy has opened a new oil pay in the northeast extension area of Blue Lake field in Brazoria County, at the 1 Turnbull et al, located in the George Robinson League. This test was drilled to a total depth of 9,367 ft., and on potential flowed 233 bbl. of 34°-gravity oil daily through a 9/64-in. choke with 1,450 lb. tubing pressure and 1,550 lb. casing pressure. Oil sand was topped at 8,510 ft., and production is through 36 perforations at 8,516-22 ft.

American Liberty 1 Dela Braden, at Blessing field in Matagorda County, is flowing 7,000,000 cu. ft. of gas daily, and approximately 200 bbl. of condensate along with the gas volume from new sand. This well was originally drilled to be used as an injection well for the cycling plant. Operators plugged back and perforated pipe at 8,425-67 ft. for production after taking the well down to 10,149 ft. on the workever. Railroad Commission potential has not been made. The 7-in. casing is cemented at 8,322 ft. with 1,976 ft. of 5-in. liner below that depth.

Production at Chocolate Bayou, Brazoria County, has been extended approximately 2,800 ft. eastward by Phillips Petroleum Co. 1 Perkins, located in the Hooper & Wade Survey. Drilled to a total depth of 11,625 ft., this well flowed a potential of 84 bbl. of 37° gravity oil daily through a 3/16-in. choke, 250 lb. flowing pressure on tubing, gas-oil ratio 870 to 1. Top of sand 10,825 ft., and 5½-in. production pipe perforated with 20 shots from 10,825-71 ft. for completion.

Skelly Oil Co. is attempting to extend production northward at Sugar Valley field in Matagorda County. The 1 Gregg Lawrence is 2,950 ft. northwest of the discovery well and it is testing for completion through perforations at 8,993-95 ft. An initial test for production was made through perforations at 8,987-95 ft. where it flowed 27 bbl. of fluid in 9½ hours showing 10 per cent water.

There were 20 new locations reported this week, 7 being wildcats, 3 in Jackson County, 2 in Chambers, and 1 each in Harris and Liberty counties. Two new oil sands and one gas-condensate sand were opened to production this week, the oil sands being one each in Brazoria and Hardin counties, and the gas-condensate in Matagorda County. Brazoria and Matagorda counties led with two completions each. Of the 10 completions 7 were oil wells and 3 dry wildcats, 1 each in Fayette, Matagorda, and Newton counties.

UPPER GULF COAST TEXAS SUCCESSFUL WILDCATS

Brazoria County: New oil sand in Blue Lake field—McCarthy Oil & Gas Corp. 1 Turnbull et al, Geo. Robinson League, TD 9,367 ft., top sand 8,510 ft., perf. 36 holes 8,516-22 ft., PT 233 bbl. 24 hours through a 9/64-in. choke, gas-oil ratio 640 to 1, TP 1,450 lb., CP 1,550 lb., gravity 34°, no water.

Hardin County: New oil sand in West Sils-

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bee field—American Republics Corp. 1 Ellery-fee, Ellery League, TD 8,143 ft., top sand 7,688 ft., perf. 20 holes 7,706-10 ft., PT 84 bbl. 24 hours through a ½-in. choke, gas-oil ratio 1,020 to 1., TP 610 lb., CP 2,240 lb., gravity 41°, 0.2 per cent water.

Matagorda County: New gas-condensate sand in Blessing field—American Liberty 1 Dela Braden Unit 1, Lot 36, old well worked over, old TD 8,320 ft., new TD 10,149 ft., plugged back and completed through perforations 8,425-67 ft., PT 200 bbl. condensate per day through a ¼-in. choke, and 7,000,000 cu. ft. gas per day, TP 3,100 lb., 51° gravity, no water.

UPPER GULF COAST TEXAS WILDCAT FAILURES

Fayette County: Amerada Pet. Corp. 1 G. L. Brown, Jr., et al, Jacob Stiffler Sur., 6½ mi. NW of Flatonia, dry, TD 4,975 ft.

Matagorda County: Providence Oil Co. 1 Matilda Adamcik Macha, I&GN Sur., Abst. 212, in Midfields discovery area, dry, TD 9,435 ft.

Newton County: Humble 1 W. W. Moore, Jr., in Bon Wier area in A. L. Stark Sur., Abst. 384, dry, TD 13,195 ft.

APPALACHIAN FIELD

Record Gas Well Completed In Baileysville District

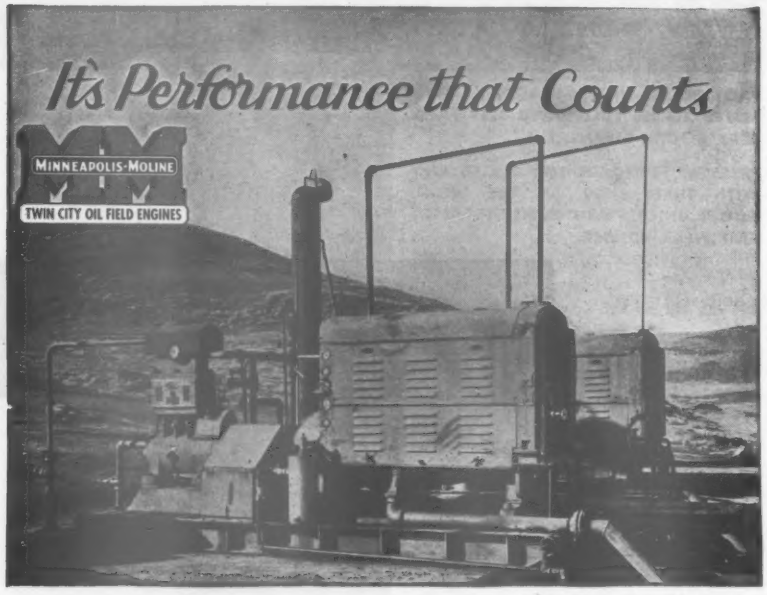
PITTSBURGH.—In Baileysville district, Wyoming County, West Virginia, the largest of the Berea wells in the new excitement was completed by Hope Natural Gas Co. at 8,907 New River and Pocohontas Consol. Coal Co. which gaged 7,502,000 cu. ft. gas natural with the gas at 1,688-92 ft., 3,105 ft., and 3,835-48 ft., total depth 3,852 ft.

In Oceana district, Wyoming County, Hope Natural Gas Co. completed 8,871 Loup Creek Colliery Co. for 440,000 cu. ft. gas from the Ravencliff sand after shot. The sand was at 1,926-84 ft.

New locations in West Virginia totaled 20 and were situated in Boone, Braxton, Calhoun, Jackson, Kanawha, Lincoln, Marion, Mingo, Pleasants, Raleigh, Ritchie, Roane, Wayne, Wirt, and Wyoming counties.

In Fairfield Township, Westmoreland County, southwest Pennsylvania, Peoples Natural Gas Co. drilled through the Oriskany sand in the deep test on Camilla Giffin farm and it was void of oil, gas or water and heavily calcited. The Oriskany extended from 7,230-90 ft. Drilling will be continued in search of gas at the top of the Silurian which has been found south on Chestnut Ridge.

New locations in the area totaled 10 and in Boggs, Cowanshanock, Kittanning, Parks, and South Bend townships, Armstrong County; Washington Township, Indiana County, and 4 in North Strabane Township, Washington County.



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ROCKY MOUNTAIN

Church Buttes Strike Looks Very Important

DENVER.—The discovery made in the Mountain Fuel Supply Co. 1 Government, C SW NW 8-16n-112w, Church Buttes structure, Uinta County, southwestern Wyoming, a joint operation with the Union Pacific Railroad Co., gives every indication of being the most important in the Rocky Mountain area this year. The well has been kept as a "tight" hole.

Testing is proceeding slowly and cautiously due to the hazards involved. The total depth, as measured by electric survey, is 12,894 ft., and the pressure is reported to be in excess of 5,000 lb. It is doubtful whether the operator has been able to determine the volume of production; whether it is a gas field, or in the gas cap of an extensive oil field. Additional drilling will probably be necessary to determine fully the character of the production.

Unofficial information is that the Frontier formation was found at 11,142-12,207 ft., based on electric surveys, and contained gas and condensate, but no test was made. The Dakota was encountered at 12,554 to 12,870 ft. The well then went into the Morrison, which is said to have shown water, and stopped at 12,894 ft. It was then plugged back and the 6⅝-in. was cemented at 12,878 ft.

This was followed by testing through perforations. One test was reported to have been made at 12,660-66 ft., through 19 holes. From this 6-ft. horizon it flowed at the rate of 12,315,000 cu. ft. of gas per day through a ¼-in. tubing choke, making 6 bbl. of oil the first hour and 12 bbl. the second. The oil has a gravity of 46.5 degrees. Just how long this test continued before perforation of other zones is not disclosed, nor have the results of any other tests been revealed.

Cat Creek discovery.—An oil discovery on the East Dome of the Cat Creek anticline in Petroleum and Garfield counties, Montana, has been made in William Hanlon 1 Government, NE NE SW 6-14n-31e, 5 miles southeast of the Ellis sand discovery of last fall.

The Hanlon well had the top of the sand at 1,815 ft., and at 1,820 ft. swabbed 90 bbl. per hour of 50.4 degrees gravity crude. After the head was swabbed down, it was deepened to 1,827 ft. and swabbed 120 bbl. in 8 hours. At the end of the test the oil stood 1,750 ft. in the hole.

The Cat Creek field has produced 25,-

(Continued on page 192)

PENBERTHY

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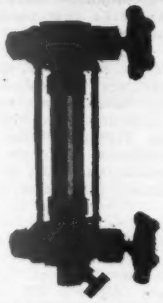

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LONE STAR No. 1—14 lbs. (2 swivels) 3/8" and 5/16" chain
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DROP FORGED LOAD BINDER Heat Treated

No. 1—10 lbs. (2 swivels) 5/16" and ½" chain
No. 2—17½ lbs. (2 swivels) ½" and 5/16" chain

STEEL CONSTRUCTION WIRE STRETCHERS

No. 3	—3 Pulleys,	plain bearings,	5/16" rope
No. 33	—3 Pulleys,	roller bearings,	5/16" rope
No. 4	—4 Pulleys,	plain bearings,	½" rope
No. 44	—4 Pulleys,	roller bearings,	½" rope
No. 88	—4 Pulleys,	roller bearings,	½" rope

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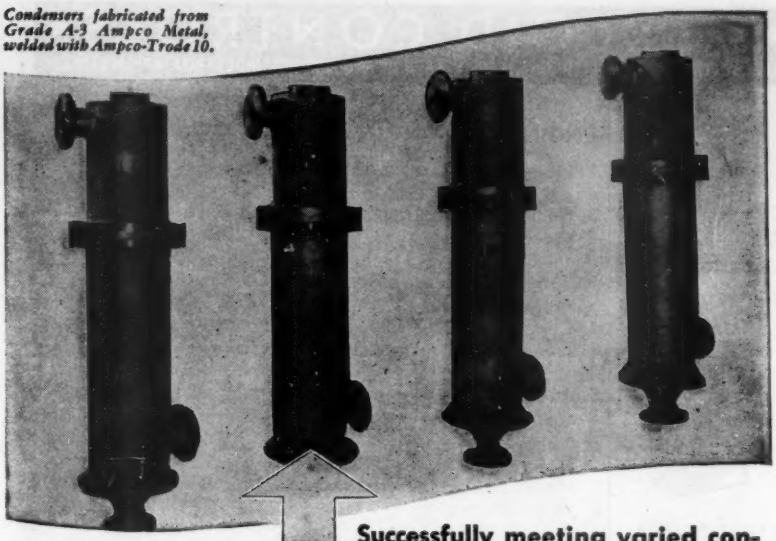

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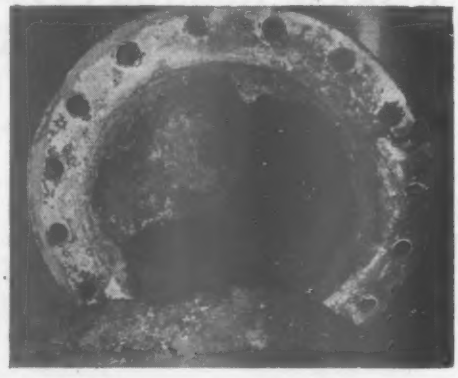

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MICHIGAN

Thirteen Completions Include Two Oil, Three Gas Wells

SAGINAW. — Thirteen completions, two small oil wells, three gas wells and eight dry holes, in Michigan were reported as operators set out 14 new locations for drilling in 8 counties.

The gas wells included one rated at 60,000,000 cu. ft. in the Mecosta-Austin field. The oil producers were an 8-bbl. wildcat in Broomfield Township, Clare County.

Three of the new locations are for gas tests in Mecosta. Other drilling for oil includes two locations each in Allegan, Clare and Missaukee, one each in Gratiot, Isabella, Kalamazoo, Montcalm and Van Buren counties.

MICHIGAN SUCCESSFUL WILDCAT

Isabella County, Broomfield Township: J. V. Wicklund Development Co. 1 Edward E. Hein, SE SE SE 13-14n-6w, pumped 8 bbl., acidized, TD 3,856 ft., plugged back to 3,166 ft.

MICHIGAN WILDCAT FAILURES

Newaygo County, Norwich Township: Michigan Consolidated Gas Co. 1 State-Culver-Bedford, NW NW NW 2-15n-11w, dry, TD 1,343 ft.

Tuscola County, Vassar Township: E. Edwin Brehm 1 Ernest Stebbins, SE SE SE 35-11n-8e, dry in Monroe, TD 2,872 ft.

CANADIAN FIELDS

Turner Valley Well Gets 119 Bbl. Initial Production

CHATHAM. — In North-Central Turner Valley, Royalite-Lowery 5, LSD 12, 11-20-3w5, finished with Madison limestone at 7,966-8,201 ft. has initial production of 119 bbl. daily.

In the Turner Valley North Extension, Continental Oils 1, LSD 8, 4-21-3w5, with Madison at 7,918-8,745 ft. flowed around 325 bbl. daily under its own power and around 690 bbl. with booster gas.

Brazeau.—On the Brazeau structure, in the Central Alberta foothills, Home-Brazeau 1, LSD 5, 17-43-17w5, is flowing 5,500,000 to 7,000,000 cu. ft. of gas from the upper Madison at 9,498-9,597 ft. under varying back pressures. Distillate production through separator averages only about 3 bbl. daily.

Conrad.—In the Conrad field, southern Alberta, Conrad-Province 57-33-B, LSD 14, 33-5-15w4, finished at 3,026 ft., is pumping 42 bbl. initial production.

Crossfield.—In the Crossfield area, northeast of Calgary, Imperial-Anglo-Crossfield 1, LSD 9, 11-28-2w5, has halted drilling at 9,517 ft. Tests of the Devonian limestone failed to show commercial production. The overlying Madison limestone is now being tested.

Lethbridge.—In the Lethbridge district, southern Alberta, Imperial-Lethbridge 2, LSD 15, 35-7-22w4, is in Banff shale at 5,878 ft. and will deepen for a test of the Devonian limestone.

Northern Alberta.—Expanding its drilling campaign in the Kinsella field east of Edmonton, Imperial Oil is carrying on preliminary work in a number of new areas in the vicinity of Edmonton. Four core-drilling crews are operating under the direction of Geologist G. C. Beard. At Fort Saskatchewan a pocket of gas was struck followed by salt water but the hole is being deepened. Another test is drilling near Lamont and work is also to be done in the Nordisty and Provost areas.

CALIFORNIA

New Productive Zone In Casmalia Field

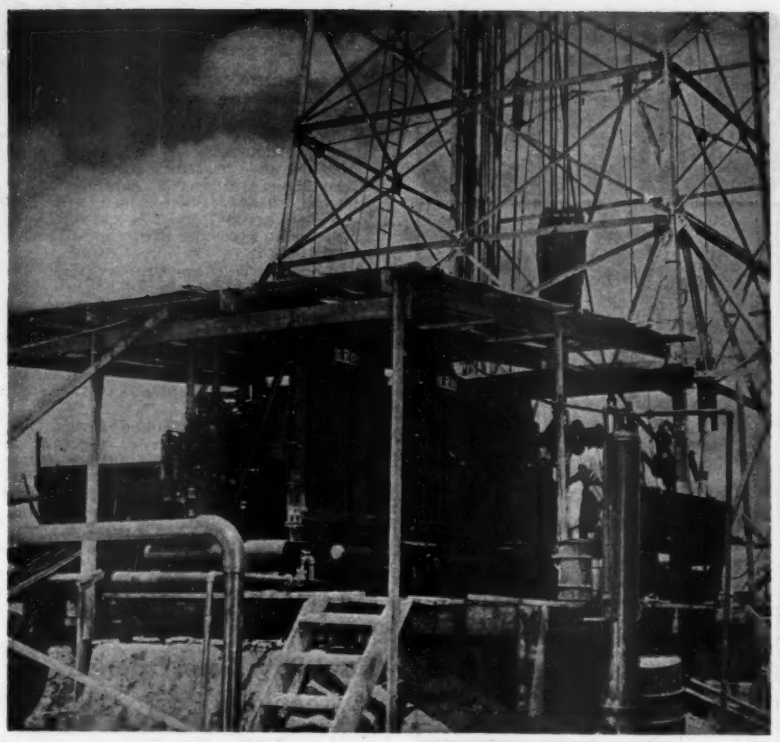
LOS ANGELES.—A. E. Bell Corp., which recently disposed of all of its Santa Maria Valley holdings and the Bell refinery to Sunray Oil Co., has uncovered a new productive zone in the Casmalia field of Santa Barbara County. The discovery well, 2 Arellanes, in Section 13-9n-35w, was brought in flowing 750 bbl. of relatively clean 21°-gravity oil daily from two perforated intervals between 4,100 and 4,800 ft. Bottom of the hole is 5,950 ft. Significant in completion of this well is that Casmalia has been a producer of low-gravity oil averaging around 10-12° gravity. Future operations will be carried on by Bell-Casmite Oil Co. Leases are in large blocks and future drilling will be along conservative lines. Work has been started preparatory to starting a second deep test at once.

There has been a temporary lull in wildcat exploration in contrast with conditions prevailing earlier in the year and during the latter part of 1945. A short time ago, the industry was closely watching wildcat work in the East Los Angeles area, Gardena, Leffingwell, East Dominguez, and La Mirada. Small completions at Leffingwell, East Dominguez, and La Mirada have temporarily removed these districts from serious consideration and Ohio Oil Co.'s Gardena wildcat has been held up for a few weeks with a fishing job that at present looks quite serious. Of the group of promising wildcats a few months ago, only the East Los Angeles-Bandini field has come up to expectations.

South of production, Chanslor Canfield Midway Oil Co. is testing its 1 Bandini in Section 21-2s-12w following the conclusion of drilling at 10,058 ft. and landing of 9⅝-in. casing at 9,938 ft.

W. T. Woodward and American Placers, Inc., have resumed drilling in 1 Flickenger, Section 36-30s-22e, recently acquired from McDonald, Burns and Norris, and is making hole in shale at 5,200 ft. This well, originally completed as a small pumper of heavy oil, is being deepened in order to determine whether the Stevens sand of Miocene age will prove productive at this location. The Navy Department found the Stevens sand highly productive about 2 miles northwest of this location and about a similar distance northeast. If these Miocene contours extend far enough along the south flank of the Hillcrest anticline they might enclose production on the Flickenger parcel. The deep test of Woodward and American Placers is located about 300 ft. from the outer boundary of Naval Petroleum Reserve No. 1 and a large completion would force offsetting work by Standard Oil Co. of California in Sections 25 and 31 as well as by the Navy Department in Section 30. In the Hillcrest area Navy Department is drilling a deep test in Section 24-30s-23e. This outpost has found the Stevens productive about 2,500 ft. west of the outer boundary of the reserve. No production has been found at any point below the Stevens at Elk Hills for the reason no well has been drilled entirely through the Miocene section and into the Eocene.

New locations made this week were higher than completions due to six new locations at Cymric and four each at Ventura Avenue and Wilmington. Proration of these new locations over several weeks, since they will not all be drilled at once, would leave locations and completions more or less in harmony with existing conditions. There has been a decline in wildcat work during the last several months but development work in proved fields has remained relatively steady. No change is anticipated in drilling although several projected wildcats will probably get under



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way within the next 60 days. Drilling at Cymric and Edison is expected to continue at about the present rate for some time.

CALIFORNIA WILDCAT FAILURES

Kern County, Kern Front: Gene Reid Drilling Co. 1 Lorraine, 2-28s-27e, bottomed in gray sand, Pyramid Hills sand 3,890 ft., grit zone 3,899 ft., Vedder sand 3,901 ft., all sands barren, TD 3,961 ft.

Kern River: Bender Oil Operations 1 Seaboard, 22-28s-28e, bottomed in hard gray sand, Pyramid Hills sand 2,968 ft., Vedder sand 3,000 ft., both sands barren, TD 3,068 ft.

McKittrick: Wilshire Oil Co. 1 McKittrick, 12-30s-21e, bottomed in gray sand, no important showings, low structurally, TD 2,056 ft.

Los Angeles County, Turnbull Canyon: A. W. Lyddon 3-1 Rowland, 17-2s-10w, bottomed in hard gray sand, could not recover fish and could not drill by, TD 8,667 ft.

San Joaquin County, Middle River: Ohio 1 Pacific States, 3-1n-4e, bottomed in gray sand, Markley sand 4,155 ft., Green sand 4,577 ft., Capay shale 5,388 ft., McDonald Island sand 5,567 ft., form. test 5,662-5,712 ft. recovered 260 ft. mud, 3,000 ft. salt water, TD 5,826 ft.

ILLINOIS

New Pay Zone Opened In Keenville Pool

MATTOON.—The Keenville pool of Wayne County was assured a new pay zone during the past week when M. J. Mitchell 2 Cornstubble, NW SE SE 28-1s-5e, flowed oil from the McClosky lime. A 1-hour drill-stem test at 3,097-3,111 ft. recovered gas in 8 minutes and flowed clean oil in 58 minutes. The Aux Vases sand, regular producing horizon in the field, showed only oil-cut mud on a drill-stem test.

Also in Wayne County, the Deep Rock Oil Corp. 1 U. S. Spicer, SW SW NE 21-1n-5e, is drilling plug with 5½-in. casing set on the McClosky at 3,072-78 ft. The 1 Spicer is a wildcat about 1½ miles west of the West Johnsonville field.

Deep Rock et al 1 Pioneer Trust and Savings Bank, NW NE SE 2-8s-8e, prospective pool opener in Gallatin County, is now on pump and testing the lower O'Hara lime at 2,853-62 ft. This well was drilled to a total depth of 2,990 ft. and plugged back to 2,870 ft. The McClosky at 2,944-52 ft. was not tested.

Illinois completions during the past week totaled 34, which included 20 oil wells and 14 dry holes. Seven wildcat wells were completed, including a successful extension well to the Marine pool in Madison County. The remaining six wildcats were dry.

New operations for the week totaled 41, of which 10 were wildcats. The wildcat tests were located three in Coles, two in Effingham, and one each in White, Richland, Marion, Shelby and Wayne counties. Of the new field wells reported under way, Wayne and White counties each received six, Coles County five, Richland four, Edwards and Clay three each, and Madison, Wabash, Hamilton and Fayette counties one each.

ILLINOIS SUCCESSFUL WILDCAT

Madison County: Jensen et al 1 Schmidt, NW NE SW 16-4n-6w, pumped 125 bbl., Devonian 1,709 ft., pay 1,716-17 ft., 100 gal. acid, TD 1,717 ft.

ILLINOIS WILDCAT FAILURES

Clinton County: J. L. Gerard 1 Gili, SE SE SE 18-3n-2w, dry at 1,216 ft., Tar Springs 870 ft., Glen Dean 903 ft., Golconda 947 ft., Barlow 1,021 ft., Cypress 1,087 ft., Paint Creek 1,156 ft., Benoist 1,198 ft.

Coles County: Carter 1 Daily-Hopper, NW SW NW 14-13n-7e, dry at 3,250 ft., Carper sand 2,831 ft., Louisiana 2,914 ft., Chattanooga 2,922 ft., Devonian 3,027 ft.

Jasper County: H. H. Weinert 1 Bergbower, SE SE SW 10-6n-10e, dry at 2,776 ft., Glen Dean 2,225 ft., Golconda 2,314 ft., Barlow 2,365 ft., Cypress 2,412 ft., Paint Creek 2,558 ft., Ste. Genevieve 2,678 ft., Fredonia 2,707 ft., McClosky 2,710 ft.

Mason County: Keith R. R. Equip. Co. 1 C. R. Wilson, NE NE NE 19-21n-5w, dry at 1,364 ft., Silurian 1,102 ft., Niagara 1,104 ft., Maquoketa 1,338 ft.

Richland County: Nat. Associated 1 Jorgison, SE SE NW 19-4n-9e, dry at 3,103 ft., Menard 2,217 ft., Glen Dean 2,471 ft., Barlow 2,632 ft., Cypress 2,678 ft., Renault 2,923 ft., Ste. Genevieve 2,996 ft., McClosky 3,032 ft.

Shelby County: Fox & Sipple 1 Storm, NE NW SW 28-11n-6e, dry at 2,260 ft., Glen Dean 2,225 ft., Golconda 2,314 ft., Barlow 2,365 ft., Cypress 2,412 ft., Paint Creek 2,558 ft., Ste. Genevieve 2,678 ft., Fredonia 2,707 ft., McClosky 2,710 ft.

PERMIAN BASIN

Andrews Pool Opener Flows 33-47 Bbl.

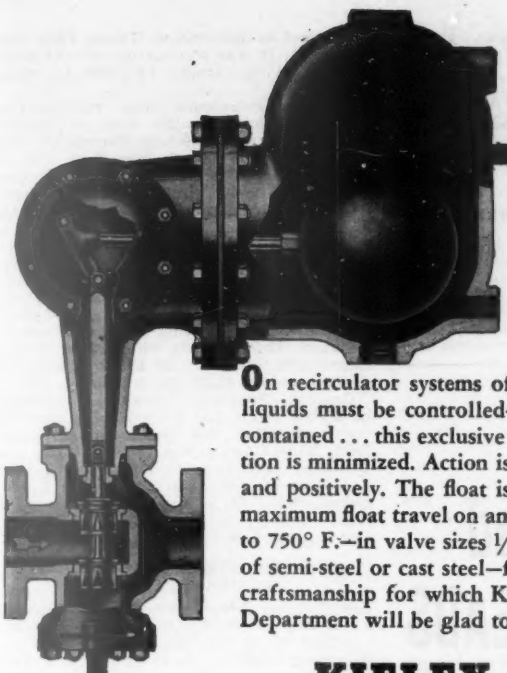
MIDLAND.—Shell Oil Co., Inc. 1 A. Nelson, Section 8, Block A-40, Public School Land Survey, opener of an Ellenburger pool in western Andrews County 2⅞ miles east of the Lea County, New Mexico, line, flowed 33 to 47 bbl. hourly on test through 20/64-in. tubing chokes after being shut in for an unspecified period. It produced 47 bbl. of oil the first hour and 33 bbl. the second hour. Gas-oil ratio was 381 to 1. Tubing pressure was 590 lb. Testing is through open hole between 10,384-453 ft., the total depth. Testing will continue. Stanolind Oil & Gas 1-A Lotus, Section 17, Block A-48, Public School Land Survey, northwest outpost to the most southerly Fullerton production in Andrews County, cored from 6,853-66 ft. and recovered 6 ft., 3 in. of white, crystalline dolomite with slight porosity and oil stain. Seven feet of light gray dolomite showing some porosity and scattered stains was recovered from a core from 6,866-84 ft. A core from 6,884-6,901 ft. was being pulled and when the hole was conditioned a drill-stem test was to be run.

Humble Oil & Refining Co. 1 L. A. Vick, Section 45, Block 5, H&GN Survey, first oil well in Kent and the most northeasterly from the Ellenburger in West Texas, was flowing into pits again to clean out after taking a 1-hour gage and making 23.58 bbl. of fluid, 56 per cent oil and 44 per cent b.s. and w. The discovery is 1½ miles west of Polar. American Liberty Oil Co. will drill 1 Connell-Young 1½ miles northwest of Humble 1 Vick. It will test the Ellenburger. It is 660 ft. from the south and east lines of Section 56, Block 5, H&GN Survey.

Amerada Petroleum Corp. 1-C Dr. E. H. Jones, Section 2, Block A-6, Public School Land Survey, ¾ mile southeast of the discovery well in the Jones Ranch field in northwestern Gaines County, has been completed to flow 468.45 bbl. of 43.2°-gravity oil in 24 hours. This is the second producer in the field. Indicated third producer in the field is 1-B Jones. A drill-stem test was run for 2½ hours from 11,397-417 ft. and 687 ft. of oil and gas-cut mud with no water was recovered. It drilled to 11,432 ft. and was drill-stem testing again.

Stanolind I Lee Irish, Section 18, Block DT, HE&WT Survey, Hale County discovery 3 miles east of Clear Fork production in the Anton field, Lamb County, swabbed 8½ bbl. of 32°-gravity oil in 1 hour, cut 1 per cent basic sediment in the Clear Fork. Total depth is 5,885 ft. Top of the Clear Fork is 5,685 ft. Operator is preparing to acidize.

Keystone-Ellenburger field, Winkler



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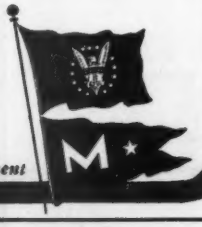

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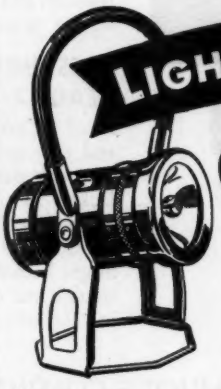

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County, had three completions this week; TXL-Ellenburger field, Ector County, North Ward Estes field, Ward County, and Howard-Glasscock field, Howard County, had two each. Welch field, Dawson County, had four locations, Howard-Glasscock field, TXL field, Fullerton field, Andrews County, and Wasson field, Yoakum County, each had three. TXL field has 34 drilling wells; Keystone-Ellenburger, 31; Fullerton field, 28; Block 31 field, Crane County, 20 and Welch field 12.

WEST TEXAS SUCCESSFUL WILDCAT

Winkler County: New oil pay—Stanolind 1 Mack Taylor, Sec. 8, Blk. B-2, PSL Sur., ½ mi. E Keystone-Ellenburger field, elev. 2,978 ft., flowed 617 bbl. day through ¼-in. choke on 2-in. tubing, perf. 8,040-8,135 ft. Devonian, gravity 32°, gas-oil ratio 536 to 1, Ellenburger 10,245 ft., TD 10,280 ft.

PANHANDLE WILDCAT FAILURE

Hartley County: Stanolind 1 Beck, Sec. 20, Blk. 15, CSS Sur., 32 mi. W Hartley, elev. 4,256 ft., granite 5,915 ft., dry, TD 5,959 ft.

SOUTHEASTERN NEW MEXICO

HOBBS. — Magnolia Petroleum Co. 11 Argo-Brunson, 9-22s-37e, assured Ellenburger production extension ⅜ mile northeast in the Brunson field in east central Lea County. On a 90-minute drill-stem test from 7,470-550 ft., it flowed 44 bbl. of 43.5°-gravity oil in 40 minutes. The oil was cut only 1 per cent by b.s. and w. Gas-oil ratio was 1,064 to 1. It was waiting on cement after running 5½-in. casing to 7,655 ft., total depth.

Amerada Petroleum Corp. will drill a 5,500-ft. wildcat 6 miles west of nearest production in the Eunice-Monument pool in south central Lea County. It is 1 H. S. Record, 1,980 ft. from the south and east lines of 26-19s-35e. Lion Oil Co. 1 Wylie, 5-23s-38e, Ellenburger wildcat ½ mile east of nearest production from the lower Permian in the southeast side of the Drinkard pool, Lea County, ran a 2-hour drill-stem test and recovered 900 ft. of drilling mud with no shows. Operator squeezed off perforations and will reperforate and test. Humble Oil & Refining Co. 1-B Federal-Leonard, 12-26s-37e, ¼ mile north of the Ellenburger discovery of Dublin field, was drilling below 10,369 ft. in lime.

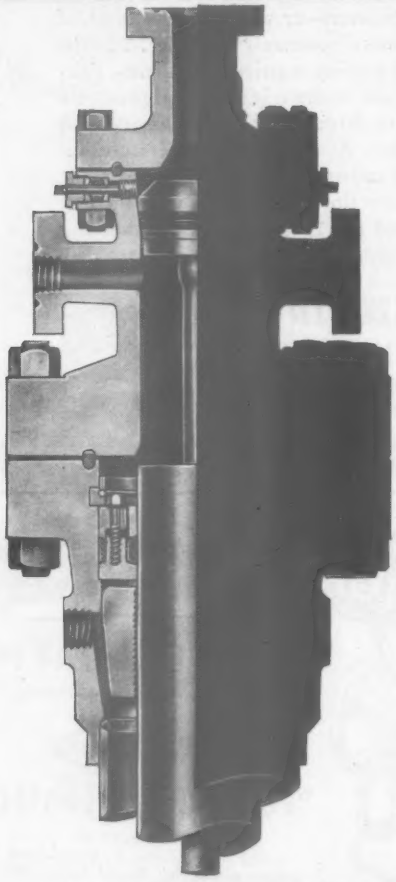
Caprock, Paddock, Drinkard, and Langlie-Mattix fields, Lea County, each reported one completion this week. Square Lake field, Eddy County, had four locations and Drinkard two. Caprock field, Chaves and Lea counties, had 28 drilling wells; Square Lakes field, 14; Grayburg-Jackson field, Eddy County, 9; Drinkard field, 7, and Paddock field, 6.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURES

Lea County: Taylor, Powell & Wallrich 1 E Page, 26-24s-34e, 1 mi. E Ochoa, elev. 3,450 ft., dry in Delaware, TD 4,710 ft.

Roosevelt County: W. J. Peterman 2 Taylor, 22-2s-30e, 12 mi. NW Elida, elev. 4,581 ft., Rustler 1,122 ft., dry, TD 1,170 ft.

W. J. Peterman 3 Taylor, 22-2s-30e, 12 mi. NW Elida, elev. 4,580 ft., Santa Rosa 609 ft., dry, TD 610 ft.



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OHIO, KENTUCKY

Brush Creek Field Extended 3 Miles

COLUMBUS.—Ohio Fuel Gas Co. 1 Geo. E. Carr, Section 27, Deerfield Township, Morgan County, adds a 3-mile south extension to the Brush Creek field. Clinton sand at 4,241-68 ft. gaged 618,000 cu. ft. natural with the pay from 4,241-58 ft. The well was shot with 30 qt. and shut in at 1,420,000 cu. ft.

Eleven strings are running now in the Hemlock Grove Berea sand pool in Meigs County. The best completion this week was Preston Oil 2 D. S. Clark, Section 2, Bedford Township. Sand was found at 1,538-52 ft. and flowed 50 bbl. first 24 hours after shot.

Four good wells were completed in the Canton area and three additional wells are drilling in. In the town of Stafford in Monroe County, William Hawkins 1 Minnie Hawkins made 60 bbl. and Hines 1 Preston Gardner made 10 bbl.

Eberly had located a wildcat test on R. B. Falconer in Section 23, Washington Township, Columbiana County. The well is to test the Oriskany sand.

Twenty-seven locations were reported for the week with Brush Creek and Cambridge six each, Ashland and Sandyville four each, and the remainder scattered. Twenty-four wells were completed with Cambridge and Ashland having five each.

OHIO SUCCESSFUL WILDCAT

Morgan County, Deerfield Township—Ohio Fuel 1 Geo. E. Carr, Sec. 27, Clinton 4,241-68 ft., 1,420,000 cu. ft., TD 4,278 ft.

EASTERN KENTUCKY

ASHLAND.—Two gas completions with a total open flow of 303,000 cu. ft. marked activities during the past week.

Kentucky-West Virginia Gas Co. completed well No. 5,634 on the H. C. Short

property, Knott County, total depth of 3,005 ft., with an open flow of 198,000 cu. ft. in shale, and 21,000 cu. ft. in Big Lime.

Kentucky-West Virginia Gas Co. completed well No. 5,637 on the L. D. Hinkle property, Martin County, total depth 2,350

(Continued on page 198)

MISSISSIPPI

Adams County Wildcat Drilling Ahead

JACKSON.—A drill-stem test at the Humble Oil & Refining Co. 1 Adams County Board of Supervisors, 660 ft. north and 1,880 ft. west of SE cor. 47-6n-1w, wildcat in Adams County, recovered 4,025 ft. of salt water and 160 ft. of drilling mud. Nine side-wall cores were taken at 1,725 ft. and 2,145 ft. Drilling is continued below 5,495 ft. in hard sand and lime. The wildcat is 4½ miles south of the Cranfield field.

About 200 ft. of oil and gas-cut mud was recovered on a 30-minute drill-stem test at 9,650-53 ft. at the Humble 1 A. M. Stewart et al, NW NE NE 32-9n-1e, Fayette field, Jefferson County. Operators are drilling below 9,666 ft. in sand.

No wildcat completions were reported from Mississippi. The Gulf Refining Co. 2 Mrs. Eretta Langley, 330 ft. south and 330 ft. west of NE cor. NW NW 11-9n-9w, Eucutta field, was completed with an initial production of 74 bbl. in 24 hours. Fayette field had one dry completion.

OKLAHOMA

Dewey County Wildcat Coring Ahead

OKLAHOMA NATURAL GAS CO. is reported coring ahead looking for the main sand body in their wildcat, 1 Green, NW NW NW 6-17n-14w, after recovering a show of oil and gas in a brief drill-stem test at 7,951-32 ft. Top of the sand and shale section has not been reported. Two attempts at a drill-stem test at a total depth of 7,982 ft. failed, but a third attempt, with packer set at 7,951 ft., produced a test of about 3 minutes duration. This test showed an unestimated amount of gas and air immediately and recovery in the pipe was approximately 720 ft. of gassy oil-cut mud. After hole was conditioned, operators cored from 7,982-86 ft. and recovered a 3¾-ft. section of broken sand and shale carrying an odor and stain. An electric log was then run and a core below 7,986 ft. was ordered. Another drill-stem test is planned after the hole has been deepened slightly.

A shallow pool has been opened in rank wildcat territory in Cotton County by the Birdwell Oil Co. 1 Houghton, SE NW NW 23-3s-11w. The 1 Houghton encountered a show of oil in a sand at 1,490 ft. and drilled to 1,498 ft., where a drill-stem test recovered 35 ft. of free oil, 95 ft. of oil-cut mud and a slight amount of muddy water. Casing has been set on top of the sand and the well will be drilled in with a spudder.

The 1 Houghton was originally projected as a 3,600-ft. Ellenburger test, but a wrench was dropped in the hole while testing the shallow pay and operators decided to complete at that depth rather than risk damage. Rig is being moved to SW NW NW 23-3s-11w, for 2 Houghton, which may be drilled to the Ellenburger although this has not been officially announced.

OKLAHOMA SUCCESSFUL WILDCAT

Okfuskee County: Fred C. Summers 1 Munson, SE SE SE 16-13n-7e, 7 bbl. from Prue at 2,734-2,851 ft., TD 2,851 ft.

(Continued on page 192)

KANSAS

Rush County Wildcat May Open New Pool

AFTER drilling to a total depth of 3,644 ft., oil was swabbed at the rate of 15 bbl. in 5 hours at the Darby & Bothwell 1 Wagner, NE NE NW 28-18-16w, wildcat in Rush County. Oil came into the hole at 3,631 ft. after pipe was set in the Reagan sand at 3,631 ft. and the plug drilled. A soft zone was logged at 3,638-43 ft. Pumping equipment is being installed. The discovery well is ½ mile south and 1½ miles west of the Albert pool.

The Arbuckle has been marked at 3,342 ft. with 5 ft. showing good saturation at the Tom Palmer 1 Lorbeer, SW SW SW 28-7-19, wildcat in Rooks County. Pipe has been set on top of the Arbuckle. Total depth is 3,343 ft. The Alcona pool opener, Republic Natural Gas Co. 1 Cooper, is 3 miles west and 2 miles north of the test. The Merten pool in Barton County will be probably extended 1 mile to the west with the E. M. Hilton 1 Schultz, NE NE 8-19-15w. After

(Continued on page 192)

LA.-ARK.

Successful Wildcat Completed in Arkansas

SHREVEPORT.—The Charles F. Steele & R. D. Franklin 1 Waters, N½ NW NE 20-14s-21w, has opened a new oil pool in Nevada County, Arkansas. Production is estimated at 100 bbl. daily. The wildcat was drilled to 2,263 ft. with pipe set through the sand with 5 bbl. of 16-gravity oil swabbed in 1 hour on initial test. The discovery well is about 2 miles northeast of the Irma pool.

A test in the Smackover is scheduled at the McAlester Fuel Co. 1 Russ, SW SW 12-16s-20w, wildcat in the Waldo area, Columbia County. The well is approximately 1 mile southwest of the Stephens pool.

The Ohio Oil et al 1-H Bond-Beene, 22-23n-8w, has opened a deeper producing sand zone in the Cotton Valley section of the old Haynesville field, Claiborne Parish, north Louisiana. After the casing was perforated at 9,900 ft. to 10,130 ft., the well produced 476 bbl. in 12 hours and 6,600,000 cu. ft. gas per day. Total depth was 10,773 ft.

Production is estimated at 41,500,000 cu. ft. of gas per day at the R. J. Caraway & F. L. Bryant 1 Mrs. M. L. Rupie in 9-16n-8e, wildcat 1½ miles south of Big Creek, Franklin Parish. Production is from perforations at 3,028-36 ft. in the Tuscaloosa sand. Total depth was 3,510 ft.

The California Co. 1 Ida Rogers Richards, 11-18n-2w, wildcat on the Choudrant block, Lincoln Parish, flowed gas and distillate on a 1-hour drill-stem test after perforations at 9,133-44 ft. opposite the Bodcaw Cotton Valley sand. Plans are to re-perforate.

Arkansas reported no wildcat completions. Field completions totaled four with two producers in Wesson, one in Stephens and a dry hole in Gum Creek.

North Louisiana had 12 completions of which 2 were dry wildcats. Big Creek added three oil wells and one gas. Lake St. John had two successful completions as oil producers. Delhi, Benton, Caddo and Haynesville each had one oil well.

NORTH LOUISIANA WILDCAT FAILURES

Madison Parish: J. L. Youngblood 1 United States Government, 2,310 ft. east and 300 ft. south of northwest corner of 34-15n-14e, dry at 8,032 ft.

Richland Parish: H. G. Lewis et al 1 School Board, 660 ft. north and 665 ft. west of southeast corner of SW SE, dry at 4,195

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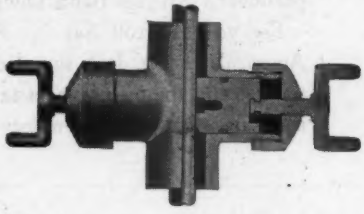

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The use of the Blowout Preventer in conjunction with the Sucker Rod Stripper provides ideal protection against handling wet rods and pressure surges in heading wells.

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"Peacetime Payroll Savings Plan" for key executives offers helpful suggestions on the conduct of the Payroll Savings Plan. In addition, it quotes leaders of Industry and Labor and their reasons for supporting the Plan.

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See your Payroll Savings Plan through to maintain your share in America's future. It is sound economics and a powerful force for good today—and tomorrow—as a safeguard for stability and a reserve of future purchasing power—money that is kept within your community.

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THE OIL AND GAS JOURNAL
Tulsa 1, Oklahoma

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SUMMARY OF MARCH COMPLETIONS

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Total footage	Rigs and drilling
New York	123	59	96	3	*61	0	123	0	0	0	209,718	137
Pennsylvania	264	145	203	11	†106	23	220	21	0	0	338,103	229
West Virginia	78	8	35	58	12	5	39	27	7	0	206,230	73
Ohio	110	26	519	48	36	10	40	59	1	0	295,692	197
Indiana	13	11	2,057	0	2	1	12	0	0	0	25,437	49
Kentucky	38	17	3,309	10	11	3	19	13	0	3	81,336	34
Illinois	156	97	13,131	0	59	2	74	80	0	0	386,591	218
Michigan	50	18	2,202	4	28	2	20	28	0	0	123,030	113
Kansas	152	83	41,016	18	‡51	0	9	140	3	0	512,226	245
Neb., Mo., Iowa	1	1	75	0	0	0	1	0	0	0	2,287	10
Oklahoma	220	117	15,529	28	§75	15	56	116	33	0	741,821	420
Texas	756	463	126,897	45	248	51	168	273	242	22	3,250,814	860
North	192	103	20,081	0	89	33	83	49	27	0	515,121	175
West Central	70	36	6,600	4	30	10	31	25	4	0	166,162	67
West	159	127	70,059	0	32	2	19	79	52	7	751,226	252
Panhandle	33	14	1,665	14	5	0	6	27	0	0	99,496	68
Eastern	80	50	11,504	14	16	1	2	42	34	1	438,553	112
Upper Gulf Coast	76	43	6,259	4	29	1	5	11	47	12	519,072	77
Lower Gulf Coast	89	68	9,387	7	14	0	2	17	68	2	572,903	74
South	40	16	967	2	22	0	14	21	5	0	134,931	20
South Central	17	6	375	0	11	4	6	2	5	0	53,350	15
Louisiana	147	80	16,608	14	53	0	16	43	57	31	962,772	175
Northern	79	44	9,359	13	22	0	14	36	26	3	366,258	82
Southern	68	36	7,249	1	31	0	2	7	31	28	596,514	93
Arkansas	23	16	1,469	0	7	0	4	16	3	0	88,415	28
Mississippi	23	13	2,125	1	9	0	1	2	14	6	172,984	42
Ala., Ga., Florida	2	0	0	0	2	0	1	1	0	0	5,678	16
Montana	21	14	1,214	1	6	1	12	8	0	0	43,172	60
Wyoming	18	10	2,191	1	7	0	0	13	5	0	79,776	58
Colorado	9	8	4,186	0	1	0	0	0	9	0	58,305	46
New Mexico	36	24	4,568	1	11	2	5	21	8	0	4,159	72
California	157	123	32,771	1	33	1	31	69	49	7	723,289	193
Utah	1	0	0	0	1	0	1	0	0	0	1,580	4
Total March	2,398	1,333	270,201	244	821	116	852	930	431	69	8,315,415	3,279
Total February	1,940	1,112	256,738	213	615	90	698	759	346	47	6,872,892	3,478

Service wells included: *59; †106, ‡1, §3.

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GOTKOOL WATER CAN

GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. Gott Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today.

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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED APRIL 20, 1946

	Total of all wells					Cum. to date		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	28	15	0	*13	50,962	472	353	0	0	0	0	0	0	0	0	0	0
Pennsylvania	66	36	3	†27	97,845	1,216	1,078	0	0	0	0	0	0	0	0	0	0
West Virginia	16	0	13	3	49,662	211	221	0	0	0	0	0	0	0	0	0	0
Ohio	24	7	10	7	68,483	325	230	1	0	0	0	1	2	0	8	11	21
Indiana	9	4	0	5	20,186	89	47	0	0	0	1	1	1	0	0	7	8
Kentucky	9	5	2	2	19,033	133	103	1	0	0	0	1	2	0	0	14	16
Illinois	34	20	0	14	83,887	588	458	1	0	0	6	7	12	0	0	98	110
Michigan	13	2	3	8	27,925	193	214	1	0	0	2	3	6	0	0	64	70
Kansas	25	11	4	10	84,585	585	463	0	0	0	5	5	8	0	3	70	81
Neb., Mo., Iowa	0	0	0	0	0	5	12	0	0	0	0	0	0	0	0	2	2
Oklahoma	46	26	2	‡18	154,891	713	701	1	0	0	9	10	20	0	10	99	129
Texas	156	85	10	61	632,245	2,365	2,138	5	1	0	24	30	57	11	7	362	437
North Central	63	26	0	§37	142,382	805	604	2	0	0	12	14	20	0	0	136	156
West	28	22	1	‡5	143,944	505	558	1	0	0	0	1	13	0	0	58	71
Panhandle	8	1	5	2	27,573	118	177	0	0	0	1	1	0	0	0	4	4
Eastern	16	13	0	3	72,080	223	90	0	0	0	1	1	6	0	1	31	38
Gulf Coast	24	15	4	5	185,218	538	506	2	1	0	4	7	14	9	4	75	102
Southwest	17	8	0	9	61,048	176	203	0	0	0	6	6	4	2	2	58	66
Louisiana	23	15	1	7	158,511	389	289	2	0	0	4	6	18	3	3	56	80
Northern	12	8	1	3	66,720	198	93	0	0	0	2	2	2	0	0	28	30
Southern	11	7	0	4	91,791	191	196	2	0	0	2	4	16	3	3	28	50
Arkansas	4	3	0	1	15,224	57	46	0	0	0	0	0	2	0	0	7	9
Mississippi	2	1	0	1	15,050	73	101	0	0	0	0	0	1	0	1	20	22
Southeastern states	0	0	0	0	0	13	10	0	0	0	0	0	0	0	0	12	12
Montana	2	1	1	0	3,952	76	80	0	0	0	0	0	3	0	0	4	7
Wyoming	3	0	1	2	15,468	50	64	0	0	1	2	3	5	0	3	19	27
Colorado	2	2	0	0	12,834	33	11	0	0	0	0	0	1	0	0	5	6
New Mexico	7	4	0	3	24,920	120	152	0	0	0	3	3	2	0	0	14	16
California	26	19	1	6	107,796	551	703	0	0	0	5	5	4	0	2	69	75
Utah	0	0	0	0	0	2	2	0	0	0	0	0	1	0	0	1	2
Total United States	495	256	51	188	1,643,459	8,259	7,476	12	1	1	61	75	145	14	37	534	1,130
Total previous week	493	278	52	163	1,657,110	7,764	7,006	11	2	5	53	71	133	13	36	873	1,055
Total April 21, 1945	470	254	43	173	1,715,750	7,476	5,766	4	1	1	61	67	179	6	40	944	1,169

Service wells included: *13, †27, ‡1, §3.

MARKET QUOTATIONS

(Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gal. as of last Monday.)

REFINERY GASOLINE

Octane (A.S.T.M.)	78-80†	73-75
Mid-Continent*	6.00-6.25	5.25-5.50
Texas Gulf Coast	6.25	5.50
New York Area		6.375
California		6.00-6.875

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	2.750	3.300
N. Texas (f.o.b. plant)	2.250	2.700
N. Louisiana (f.o.b. plant)	2.625	3.150
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.35
Conroe	1.53
Tepetate, Louisiana, avg. grav.	1.30
Illinois Basin	1.47
Pecos County, Texas	1.05
Bradford, Pennsylvania	3.10
Van, Van Zandt County, Texas	1.18

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$0.90	....	....	....
19-19.9	.94	....	$1.16	$0.80
20-20.9	.98	$0.95	1.18	.82
21-21.9	1.02	.97	1.20	.84
22-22.9	1.06	.99	1.22	.86
23-23.9	1.10	1.01	1.24	.88
24-24.9	1.13	1.03	1.26	.90
25-25.9	1.17	1.05	1.28	.92
26-26.9	1.21	1.07	1.30	.94
27-27.9	1.25	1.09	1.32	.96
28-28.9	1.28	1.11	1.34	.98
29-29.9	1.30	1.13	1.36	1.00
30-30.9	1.33	1.15	1.38	1.02
31-31.9	....	1.17	1.40	1.04
32-32.9	....	1.19	1.42	1.06
33-33.9	....	1.21	1.44	1.08
34-34.9	....	1.23	1.46	1.10
35-35.9	....	1.25	1.48	1.12
36-36.9	....	1.27	1.50	1.14
37-37.9	....	1.29	1.52	1.16
38-38.9	....	1.31	1.54	1.18
39-39.9	....	1.33	1.56	1.20
40 and above	....	1.35	1.58	1.22

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended April 13, 1946

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks—Gasoline	Stocks—Distillate	Stocks—Residual
East Coast	733	22,982	9,980	6,273
Appalachian	157	4,064	504	437
Ill., Ind., Ky.	743	23,600	3,621	3,109
Okla., Kan., Mo.	381	9,357	1,570	1,086
Inland Texas	225	3,041	324	738
Tex. Gulf Cst.	1,144	15,782	5,171	4,026
La. Gulf Cst.	316	3,964	1,456	1,066
N. La., Ark.	51	1,850	479	257
Rocky Mtn.	128	2,496	418	652
California	758	15,308	6,524	20,218
Total 4-13-46	4,636	102,444	30,047	37,862
Total 4- 6-46	4,533	104,226	29,253	37,289
Total 4-14-45	4,813	95,777	28,071	41,228

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
April 13, 1946	221,260,000
April 6, 1946	221,214,000
April 14, 1945	221,024,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	April 20 crude oil	Bureau of Mines April demand	April 13 crude oil
Alabama	1,100	700	1,100
Arkansas	77,500	78,000	77,950
California	859,750	834,000	856,200
Colorado	27,180	22,000	26,740
Eastern	66,100	61,900	64,400
Florida	100	100	100
Illinois	207,650	197,000	210,450
Indiana	18,700	14,000	21,450
Kansas	262,400	250,000	259,150
Kentucky	31,050	29,500	30,600
Louisiana	372,750	374,000	372,000
North Louisiana	85,950	.....	85,200
South Louisiana	286,800	.....	286,800
Michigan	44,340	46,000	49,265
Mississippi	55,700	53,000	55,050
Montana	23,920	21,000	23,910
Nebraska	750	800	750
New Mexico	95,300	99,000	95,300
Oklahoma	378,750	367,000	379,400
Texas	2,054,600	2,080,000	2,054,600
East Texas	372,000	.....	372,000
East Central Texas	139,700	.....	139,700
North Central Texas	158,700	.....	158,700
Texas Panhandle	82,000	.....	82,000
West Texas	495,000	.....	495,000
Southwest Texas	326,500	.....	326,500
Texas Gulf Coast	480,700	.....	480,700
Wyoming	104,600	92,000	102,400
Total United States	4,682,240	4,620,000	4,680,815
Change from previous week	up 1,425		

Total production January 1-April 20 ..... 511,498,925 bbl.
Same period last year ..... 523,088,550 bbl.

CRUDE-OIL STOCKS 221,260,000 bbl. as of April 13—up 46,000 bbl. One year ago 221,024,000 bbl.

GASOLINE STOCKS 102,444,000 bbl. as of April 13—down 1,782,000 bbl. One year ago 95,777,000 bbl.

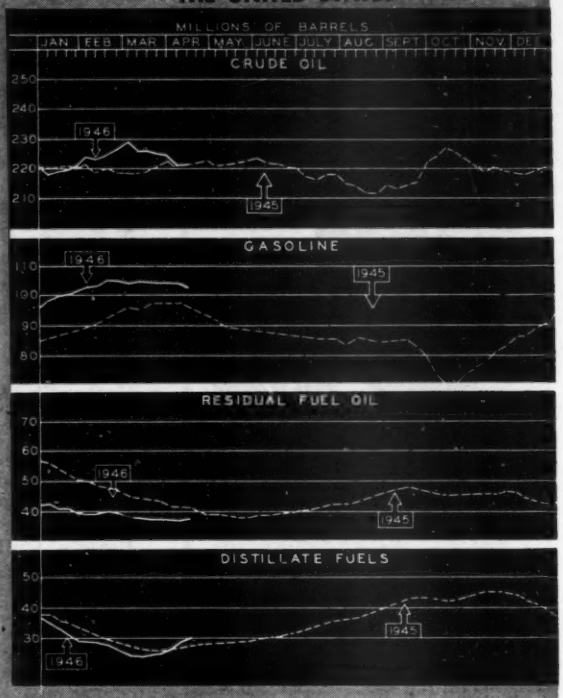
RESIDUAL FUEL-OIL STOCKS 37,862,000 bbl. as of April 13—up 573,000 bbl. One year ago 41,228,000 bbl.

GAS OIL AND DISTILLATE STOCKS 30,047,000 bbl. as of April 13—up 794,000 bbl. One year ago 28,071,000 bbl.

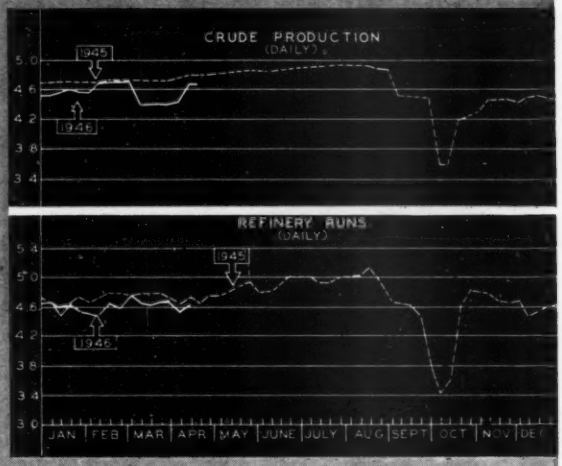
CRUDE-OIL PRODUCTION 4,682,240 bbl. as of April 20—up 1,425 bbl. One year ago 4,793,750 bbl.

REFINERY RUNS 4,636,000 bbl. daily week ended April 13—up 103,000 bbl. One year ago 4,813,000 bbl.

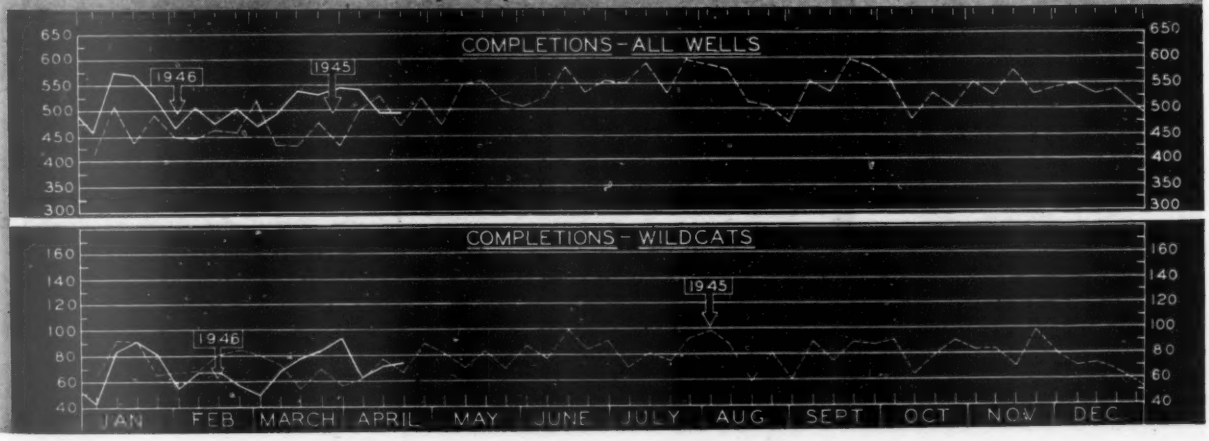
OIL STOCKS IN THE UNITED STATES



DAILY OPERATIONS



Solid line charts weekly completions, service wells in Eastern area included



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For oil field, locomotive type and marine boilers. Water shows black—steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

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*Trade Mark Reg. U. S. Pat. Off.

Among the

Drilling Contractors

J. R. McGill Drilling Co. has the contract to drill a wildcat test near Wittman, Ariz., for John R. Robertson.

Harber Drilling Co. has been contracted by E. M. Swearer to drill five Arbuckle lime wildcat tests on blocks in southwestern Kansas. Development will first begin on the block in Ford County and is to start within 30 days.

Hewgly Drilling Co. is the contractor at the Stanolind Oil & Gas Co. 1 Perpetual Forest, wildcat in 5-11s-11e, Dixie County, Florida.

Mealy-Wolfe Drilling Co. is building derrick at the Power Oil Co. et al 1 Lula Brown, in NW NW SW 27-14n-3e, Lincoln County, Oklahoma. The well is a semiwildcat near Warwick.

Lincoln Drilling Co. will drill the C. W. Collin 1 Baublitz-Stewart, SW NW SW 35-17n-4e, in Bay County, Michigan.

Falcon - Seaboard Drilling Co. is drilling ahead at Cities Service Oil Co. 13 Livingston, NE NW 13-8n-6e, Seminole County, Oklahoma.

Wolf & Magee Drilling Co. will drill the Southern Natural Gas 1 Mattie Bailey et al, 33-17n-6w, in the Bear Creek field, Bienville Parish, Louisiana.

Miller Drilling Co. has been contracted by the Clawson Development Co. to drill the 1 Nicholaa Kiekover, NW NE NW 32-5n-13w, in Ottawa County, Michigan.

Newt Barett Drilling Co. is the contractor at Davon Oil Co. 1 McVey-B, in NE NE NE 30-15n-7e, Creek County, Oklahoma.

Goodpasture Drilling Co. of Great Bend, Kans., is drilling the Charles Walters 1 Bush-Pickering Ranch in SW NE 29-46n-32w, Cass County, Missouri. The hole was drilled to 2,408 ft. in the period from March 22 to April 7 which is believed to be a record in that part of the country.

W. C. Taggart Drilling Co. has the contract to drill the Michigan Consolidated Gas Co. 9 Michigan Consolidated Gas Co., NW SW 3-14n-9w, in Mecosta County, Michigan.

Olsen-Blount Drilling Corp. is fishing for bit cones at 2,885 ft. at the Culbertson & Irwin 2 Gutman in SE NE 18-24s-37e, Langlie-Mattix field, Lea County, New Mexico.

Olsen-Blount Drilling Corp. is drilling ahead at the R. Olsen Oil Co. et al 1 J. C. Roberts, 330 ft. north of the south line and 330 ft. east of the west line of TE&L Survey 1621, wildcat in Throckmorton County, Texas.

Ajax Drilling Co. was awarded the contract to drill five wells in Michigan. One well in Bay County is the Gordon Co. 1 W. Augustyniak, NW

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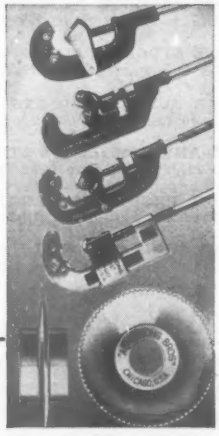

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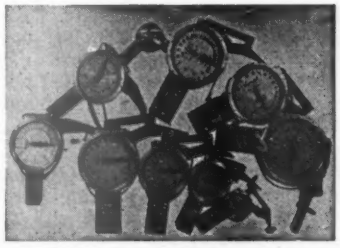

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SE NW 2-16n-4e. Of the four wells in Gratiot County, two are for Arthur E. Williams, the 1 Elba Gas Unit, SW 14-9n-1w, and the 3 Elba Gas Unit, NE 15-9n-1w. The contract for the remaining two wells is with Ray W. Matlock and Arthur E. Williams, the 4 Elba Gas Unit, SW 15-9n-1w, and the 5 Elba Gas Unit, NW 22-9n-1w.

Brown-Eakle Drilling Co. is running up rigging at Phillips Petroleum Co. 1 Brimblecombe, in SW SE SW 31-5s-10e, White County, Illinois.

R. E. King Drilling Co. will drill the M. E. Holloway and Raymond M. Whyte 3 Vernie Jankowski, SE SE NE 23-19n-4e, in Arenac County, Michigan.

Penrod Drilling Co. was awarded the contract by Haroldson L. Hunt to drill two wells in the East Haynesville field, Claiborne Parish, Louisiana. The wells are the 1 Burdson-Wroten et al, NE NW 22-23n-7w, and the 1 Owens-Kirkpatrick, SE SW 14-23n-7w.

C. E. O'Neal Drilling Co. will drill the Fisher Oil Co. 1 M. Barker, 8-O-22, in Henderson County, Kentucky.

Hupp-Hume Drilling Co. will drill Otis Blankenship 1 C. I. Dawson, in NE NE SW 9-5s-14w, White County, Illinois.

Rowan Drilling Co., Fort Worth, has contract to drill Amerada Petroleum Corp. 1 H. S. Record, 5,500-ft. wildcat 6 miles west of Eunice-Monument pool, south central Lea County, 1,980 ft. from the south and east lines of 26-19s-35e.

Sam Tennant Drilling Co. is the contractor at H. W. Snowden Oil & Gas, Ltd. 7 Warren, in NW¼ 19-28n-1e, Kay County, Oklahoma.

Sumner Nelson Drilling Co. has been contracted to drill the R. D. Brown, Inc. 2 Martin Birch, 330 ft. from north line and 330 ft. from east line of NE NW 21-2n-6w, in Daviess County, Indiana.

E. M. Shields Drilling Co. will drill the Socony-Vacuum Oil Co. 1 George and Masie Wolven, SW SE SW 25-9n-11w, in Kent County, Michigan.

Big Chief Drilling Co. has appointed George W. Riley as its drilling superintendent in charge of the Permian Basin area with office at Odessa, Tex. Riley was formerly with M-B-K Drilling Co. in the same capacity.

Slaubaugh Brothers Drilling Co. will drill the E. L. Shoudy 3 Allie P. and Clara J. Hancock, in NE NW 30-1n-6w, Pike County, Indiana.

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PERSONALS

Humble Engineer Is Head of East Texas A.I.M.E. Chapter

A NATIVE of Louisiana who received his engineering education in Tennessee and Oklahoma and who has been associated with Humble Oil & Refining Co. nearly 18 years now heads the East Texas section of the American Institute of Mining and Metallurgical Engineers.

He is Riley A. Aucoin, who has become chairman of the section.

Born in Patterson, La., in 1903, Aucion took 2 years academic work at the University of the South, Sewanee, Tenn., and in 1925 transferred to the University of Oklahoma where he received a degree in petroleum engineering. While at the university of Oklahoma, he served as president of the Petroleum Engineers and president of Pick and Hammer Club, an A.I.M.M.E. affiliate.

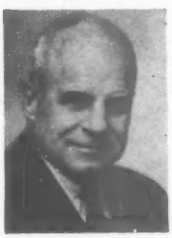
A few months after his graduation in 1928, Aucoin joined the petroleum engineer department of Humble Oil & Refining Co. He is now assistant petroleum engineer in the East Texas division at Tyler.

Charles F. Smith has been transferred from the Bayway refinery of Standard Oil Co. of New Jersey to New York as administrative assistant in the parent company's employe relations department. He is succeeded by **William B. Maloney** as coordinator of employe relations in the New Jersey plant.

Charles P. Baker, formerly assistant to **W. H. Montgomery,** manager of the East St. Louis refinery in the Lubrite division of Socony-Vacuum Oil Co., Inc., has been promoted to general superintendent of the plant. Before entering the Army in 1942, Baker was technical adviser to the operating department of the Beaumont, Tex., refinery of Magnolia Petroleum Co. During the war, he became chief of the aviation section of Petroleum Administration for War.

E. N. Hickey, chief of the Rocky Mountain exploration division of California Co. with headquarters in Denver, has been transferred to the home office at New Orleans. He has been succeeded by **J. N. Kirby,** from the Canadian division.

Lt. Gen. James H. Doolittle, former commander of the Eighth Air Force, and **Dr. Jerome C. Hunsaker,** head of the department of mechanical



J. H. DOOLITTLE

DR. J. C. HUNSAKER

and aeronautical engineering, Massachusetts Institute of Technology, have been elected to the board of directors of Shell Union Oil Corp. Doolittle became manager of the aviation department of Shell Oil Co., Inc., in 1930, and upon his return to civilian life last January, he was made a vice president of Shell Union. Dr. Hunsaker, a graduate of the United States Naval Academy, is noted for his work in aviation design.

King Sanders has been promoted to superintendent of the western division, Panhandle Eastern Pipe Line Co., with headquarters at Liberal, Kans.

William Williams has been promoted from assistant foreman to foreman of the absorption plant in the San Joaquin division of Shell Oil Co., Inc. **Urban M. Warren,** drilling foreman in Shell's production department, has been transferred from the San Joaquin division to the Los Angeles basin area. In Shell's manufacturing department, **Marshall J. Waters,** Martinez refinery engineer, has been made a senior engineer, product application and development in the head office in San Francisco.

T. E. Sullivan, formerly technologist for Shell Oil Co., Inc., at its Deer Park (Houston) refinery, has been named assistant manager of the petroleum division of J. F. Pritchard & Co. with headquarters in the Gulf Building in Houston.

John J. Bourke, recently released from the Army, has been made a promotional assistant for commercial gas of the American Gas Association.

Horton T. Pruett, formerly chief engineer for Chicago Corp., has joined **John W. Crutchfield** in a consulting petroleum engineering firm with offices in the Nixon Building in Corpus Christi, Tex.

L. J. Drake, president of Union Tank Car Co. since 1926, has been elected chairman of the board of directors. **B. C. Graves,** associated with the company since 1903, was named president.

Harry Leyendecker, formerly chief scout and statistician of Tide Water Associated Oil Co., has joined the executive staff of the oil and gas department of the City National Bank in Houston. During the war, he was a transportation official in the Petroleum Administration for War.

W. C. Lane, associated with Standard Oil Co. of California since 1926, and until recently president of California Commercial Co., a subsidiary, has been appointed assistant manager of California Standard's foreign trade department. He was president of California Commercial from 1941 to 1943 and reassumed that position after being

discharged from the Navy as a lieutenant commander.

Johnnie McBride, Standard Oil Co. of New Jersey, has been named chairman of the new Caddo Parish division of the Louisiana Petroleum Institute. **Will Gray,** Magnolia Petroleum Co., is vice chairman, and **Ray Wynn,** Arkansas Fuel Oil Co., secretary.

W. C. WHALEY

W. C. Whaley, vice president of Barnsdall Oil Co. and general manager in California, has been elected president of the Oil Producers Agency of California, succeeding **C. P. Watson,** vice president of Seaboard Oil Co. Other new officers are **H. E. Woodworth,** Safe Oil Co.; **R. H. Garrison,** Hellman Estate; **C. C. Spicer,** Republic Petroleum Co.; **C. A. Johnson,** Holly Development Co., all vice presidents; **W. A. Russell,** Seaboard Oil, secretary-treasurer, and **Verne Harrell,** Bankline Oil Co., assistant secretary-treasurer. **Rush M. Blodgett** was reelected executive vice president for the sixteenth year.

Karl L. Kellogg, Los Angeles, has been elected chairman of the California section of the American Association of Oilwell Drilling Contractors. **E. J. Simons** was reelected secretary. **E. C. Brown** is the retiring chairman.

John W. Givens, chemist at Shell Development Co.'s Emeryville, Calif., laboratory, has been advanced to assistant head of the plant's physics department. **R. A. Pratt,** a department manager at Shell Chemical's Torrance, Calif., plant, has been transferred in the same capacity to Houston, and **W. W. Williams,** formerly senior technologist, has been shifted to Cleveland, Ohio, as district manager.

James E. McNary, special adviser on technical problems to Standard Oil Co. (N. J.), and **Harold O. Laffitte,** an engineering supervisor in the company's tanker fleet, have been given the Exceptional Civilian Service Award from the Army Service Forces for their work in wartime petroleum assignments. McNary, former Army colonel, received the award for his work in introducing and developing the first portable pipe lines in the North African campaign, special gasoline drums and for developing a field fueling device. Laffittee won his citation for service in expediting the unloading of tankers in invasion ports.

W. L. Connelly, chairman of the board, Sinclair Prairie Oil Co.; **Henry Phillips,** president, Venezuelan Petroleum Corp., and **Hugh Russell,** assistant to Phillips, left Miami this week for an inspection trip of the Sinclair company's Venezuelan properties.

BRAD MILLS

Brad Mills has been named executive vice president of the American Association of Oilwell Drilling Contractors, filling a new position created by the board of directors. Mills' former position of executive secretary was discontinued. **J. Doyle Settle,** who has been with the association about 2 years, has been named secretary.

Robert P. Russell, president of Standard Oil Development Co., will be awarded the gold medal of the American Institute of Chemists at the institute's twenty-third annual meeting in New York May 17.

G. L. PARKHURST

George L. Parkhurst has been elected president of Oronite Chemical Co., a Standard Oil Co. of California subsidiary, succeeding **R. G. Smith,** who will continue as a member of the board of directors. Parkhurst formerly was vice president in charge of products and processes. During the war, he served with the Petroleum Administration for War as assistant director of refining and later as contract executive.

Jeff A. Robertson, who served as chairman of the Kansas Corporation Commission before entering the Army in 1943, will again become chairman about May 1, succeeding **Richard B. McEntire,** who resigned.

Gulf Coast Maps Revised

HOUSTON. — Statewide Map Co. announces the complete revision of the Louisiana Gulf Coast maps, covering the south half of the state and drafted in two sections on a scale of 1 in.:2 miles and showing all dry holes, total depths, completion data, etc. Oil and gas wells are posted as of April 15, 1946.

The oil fields are colored green; gas fields, red; geophysical prospects and salt domes, yellow; depleted fields, brown; and salt and sulfur production, purple.

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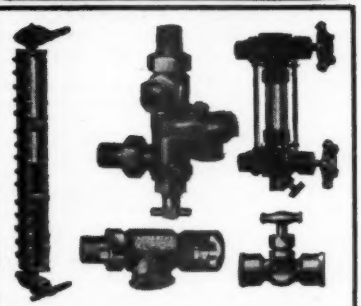

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CALENDAR

April

A.P.I. directors' meeting, Blackstone Hotel, Fort Worth, April 28.

Texas Railroad Commission, flare gas elimination hearing for North Texas operators, April 28, Fort Worth.

Independent Petroleum Association of America, midyear meeting, Houston, April 29-May 1.

May

Houston Nomads, River Oaks Country Club, May 7.

Pennsylvania Gas Association, Galen Hall Wernersville, Pa., May 7-9.

Natural Gas Department, American Gas Association, annual spring meeting, Hotel Gibson, Cincinnati, May 7-8.

National Association of Corrosion Engineers, annual meeting, President Hotel, Kansas City, Mo., May 7-9.

Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, eighteenth annual joint conference, Mayo Hotel, Tulsa, May 7-9.

Los Angeles Nomads, Mayfair Hotel, Los Angeles, May 8.

Indiana Gas Association, annual meeting, French Lick Springs, Ind., May 9-10.

Southern California Meter Association, May meeting, Rio Hondo Country Club, Downey, Calif., May 16.

Panhandle Producers and Royalty Owners Association, annual meeting, Amarillo, Tex., May 16.

A.P.I. division of production, Southwestern district meeting, Washington-Youree Hotel, Shreveport, May 17-18.

National Oil Scouts and Landmen's Association, Jackson, Miss., May 23-25.

June

Society of Automotive Engineers, semi-annual meeting, French Lick, Ind., June 2-7

Houston Nomads, River Oaks Country Club, June 4.

Pennsylvania Oil Producers Association, Bradford district, fifteenth annual meeting, Pennhills Club, Bradford, Pa, June 6.

A. P. I. division of production, Mid-Continent district meeting, Skirvin Hotel, Oklahoma City, June 6-7.

Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette, Lexington, June 7-8.

Los Angeles Nomads, Mayfair Hotel, June 12.

A.P.I. division of production, spring meeting, William Penn Hotel, Pittsburgh, June 13-14.

Federal Power Commission hearing in the natural-gas industry investigation, Washington, June 17.

American Society for Testing Materials annual meeting, Buffalo. June 24-28.

Pennsylvania Grade Crude Oil Association, twenty-third annual meeting, William Penn Hotel, Pittsburgh, June 27-28.

July

Houston Nomads, River Oaks Country Club, July 2.

Los Angeles Nomads, annual meeting and party, Mayfair Hotel, July 10.

August

Houston Nomads, River Oaks Country Club, August 6.

American Institute of Chemical Engineers, western convention, Palace Hotel, San Francisco, August 25-28.

September

Houston Nomads, River Oaks Country Club, September 3.

Los Angeles Nomads, Mayfair Hotel, September 11.

National instrument conference, sponsored by Instrument Society of America, William Penn Hotel, Pittsburgh, September 16-20.

National Petroleum Association, forty-fourth annual meeting, Hotel Traymore, Atlantic City, N. J., September 18-20.

October

Houston Nomads, River Oaks Country Club, October 8.

American Gas Association, annual convention, week of October 7, Atlantic City, N. J.

American Gas Association, annual meeting, Atlantic City, October 7-12.

Kansas Fields

(Continued from page 183)

drilling to a total depth of 3,584 ft., the hole filled up with oil in 6 hours. Basal sand was topped at 3,575 ft. and pipe was set at 3,578 ft.

Kansas had 25 completions of which 5 wildcats were dry. Field well completions totaled 20 with 11 oil, 4 gas and 5 dry.

KANSAS WILDCAT FAILURES

Barton County: Raymond Gear 1 Axman, NE NE NE 14-17-15w, dry at 3,505 ft., Arbuckle 3,480 ft.

Hodgeman County: Continental Oil Co. 1 P. A. Reginer, NW NW SW 2-24-21w, dry at 4,998 ft., Arbuckle 4,954 ft.

Rooks County: Brunson & Martin 1 C. W. Jones, NE NE NE 3-6-19w, dry at 3,500 ft., Arbuckle 3,449 ft.

Seward County: Stanolind Oil & Gas Co. 1 Adams Ranch Gas Unit No. 1 N/2 S/2 NW 1,800 ft. south and 1,320 ft. east of northwest corner of 14-35-31w, dry at 6,800 ft.

Sumner County: Ashland Oil & Refining Co. 1 George Patton, SW NE SW 31-32-2e, dry at 3,766 ft., Simpson sandy shale, 3,725 ft.

Rocky Mountain Area

(Continued from page 176)

000,000 bbl. of crude from the first and second Cat Creek sands, the third Cat Creek carrying water. When the Ellis sand discovery was made on the Mosby high last fall, production was down to 200 bbl. per day. The deeper sand at Mosby appears to have spotted production, the best well within a small area making 1,100 bbl. natural, with several dry holes in the immediate vicinity.

A. B. Cobb is drilling a deep test midway between the Mosby and East Domes. The Hanlon discovery is on a block of 1,860 acres in which British Dominion Oil Co. and Central Montana Oil Co. each own a one-fourth interest.

Continental discovery at Corley.—Continental Oil Co. 1 Vannoy, NE SW NE 3-43n-93w, Corley Dome, Hot Springs County, Wyoming, reported a discovery last week in the Embar sand at 4,134 ft., total depth, is still testing. After setting the 7-in. on top of the sand at 4,095 ft., it swabbed 271 bbl. of fluid in 21 hours, of which 37 per cent was basic sediment and water. The water amounted to 1.9 per cent, and was decreasing. Until the cleaning up process is completed, its capacity will not be known, but is expected to be much better than indicated in the preliminary testing.

Golden Eagle unitized.—The Golden Eagle Dome north of Thermopolis, Hot Springs County, Wyoming, in which the Pioneer Oil Corp. made a discovery in the Muddy sand at 6,724-70 ft. in the summer of 1944, followed early in 1945 by a discovery in the Dakota sand at 7,165-7,202 ft. in a second well, has been unitized and will go on production as soon as the unitization plan is approved in Washington.

The first well made 3,500,000 cu. ft. of gas and 250 bbl. of 58° gravity condensate on a 12-hour test through a choke on the tubing. The second well made 80 bbl. per day natural of 52° gravity crude. The wells were shut in after testing and no additional drilling has taken place. The unit comprises 2,800 acres. Other interests include the Progress Oil Co. and the Hancock-Fortin interests, of Billings. Plans call for the installation of gasoline extraction and gas repressuring units.

Gas discovery at Table Rock.—Texas Co., joint with the Union Pacific Railroad Co., has opened a new gas field in central Sweetwater County, southwestern Wyoming, in its 1 Unit, SE NW NW 1-18n-98w, approximately 85 miles east of the new Church Buttes discovery of Mountain Fuel Supply Co. The nearest producing areas are the Baxter Basin structure 30 miles to the west and the Hiawatha oil and gas field 40 miles to the south.

It was completed at a total depth of 3,831 ft. in the "Lance"(?) sand in the Laramie beds of upper Cretaceous age. The formation, which is pre-Wasatch, is widespread in Wyoming.

The well made 5,692,000 cu. ft. of gas through perforations in the casing, the shut-in pressure being 1,225 lb. The structure is unitized and has 15 sections (9,600 acres) within the unit, of which the Union Pacific owns about half and The Texas Co. the remainder.

New operations.—Twenty new operations were reported, of which 3 were in the Rangely field in Colorado; 1 each at Gebo, No Wood, Spence and Wertz, in Wyoming; and 13 in Montana. The latter includes two in Cut Bank, three in Cat Creek and four in Kevin-Sunburst. The wildcats include Waeron Skelton 1 Myra Skelton Tract 38, Section 5-48n-90w, No Wood structure, Washakie County, Wyoming, in which the Tensleep at 1,300 ft. is the objective. Among the Montana wildcat locations are H. F. Poston 1 Wendt, NW SE 11-28n-21w, Rodger Lee district, Flathead County.

Completions.—Seven wells were completed, of which 3 were oil wells, 2 gas walls, and 2 dry holes. The oil wells included 2 in the Rangely field for 435 bbl. and one in Cut Bank for 119 bbl.

WYOMING SUCCESSFUL WILDCAT

Table Rock, Sweetwater County: Texas Co.-Union Pacific Railroad Co. 1 Unit, SE NW NW 1-18n-98w, TD 3,831 ft., 5,692,000 cu. ft. dry gas in sand in the Laramie beds, through perforations. Shut-in pressure 1,225 lb.

WYOMING WILDCAT FAILURES

Sheridan (Beaver Creek), Sheridan County: Texas Co. 1 Forbes, C SE NE 19-55n-85w, dry, TD 8,447 ft., in Madison, top of Madison 8,230 ft.

Big Muddy, Converse County: Dyer & Rice 1 Anderson, SW SW NW 3-33n-76w, dry, TD 3,190 ft., water with traces of oil in Wall Creek at 3,223-39 ft., outpost well.

Oklahoma Fields

(Continued from page 183)

OKLAHOMA WILDCAT FAILURES

Cleveland County: Stanolind et al 1 Horn, NE NE NE 22-8n-1w, dry at 7,300 ft., second Wilcox 7,259 ft.

Comanche County: Hembre & Routh 1 Routh, NE NW SE 2-1s-11w, dry at 2,392 ft., limestone 2,190-2,278 ft.

Creek County: Deep Rock 1 Eathan, NW NE SW 28-15n-10e, dry at 3,215 ft., Wilcox 3,195 ft.

Hubbel & Webb 1 Todd, NE NE SW 22-14n-7e, dry at 3,338 ft., Bartlesville zone 3,290 ft.

Lincoln County: R. L. Aiken et al 1 Kinder, SE NE NE 5-15n-5e, dry at 4,454 ft., second Wilcox 4,435-54 ft.

Summitt Drilling Co. 1 Bullard, NE NW SE 26-12n-2e, dry at 5,901 ft., second Wilcox 5,882 ft.

Murray County: Helmerich & Payne 1 Saddler, SE NW NE 29-1n-2e, dry at 3,176 ft., Arbuckle 3,079 ft.

Okfuskee County: Fred C. Summers 1 Leonard, NW NW NW 23-13n-7e, dry at 3,690 ft., Detroit 3,668 ft.

Osage County: Mid-Continent Oil Co. 1 Osage, NE SE NE 29-24n-4e, dry at 4,309 ft., Arbuckle 4,180-4,309 ft.

Equipment Men in the News

New Supply House Opens in Tulsa

Petroleum Supply Corp. has been established in Tulsa by C. A. King, Jr., and E. R. Lundberg with offices in the National Mutual Building.

C. A. KING, JR.

E. R. LUNDBERG

Petroleum Supply Corp. represents in a suppliers' capacity, varied large manufacturers of oil-field equipment for all phases of the petroleum industry, giving special emphasis to production.

King was formerly with Hinderliter Tool Co. of Tulsa and Lundberg served with T. W. Simmons Oil Co. and Junior Oil Co. of California.

Downie Succeeds Ballard As Sales Manager

Retirement of Charles M. Ballard as manager of sales, wire rope division, Bethlehem Steel Co., has been announced by Paul Mackall, vice president. Norman R. Downie, a member of the wire-rope sales organization, has been appointed manager of sales for the division.

Daniels Elected Vice President Of Hydril Co.

Earl M. Daniels has been elected vice president of Hydril Co. He has been connected with the company as a salesman and sales manager since the company was organized in 1933.

Climax Industries Sales Offices Now Located in Chicago

Announcement has been made by John H. Seippel, vice president of Climax Industries, that general sales offices are located in Chicago at 1901 S. Western Avenue. This includes the sales departments of McAlear Manufacturing, Chicago and Tulsa, and Climax Engineering, agricultural and industrial division, Clinton, Iowa. Also the advertising department of Climax Industries will be located in Clinton, and John W. Peterson has been appointed advertising manager.

Warner Lewis Expands

A postwar expansion program calling for addition to present facilities and broadening of its oil-industry line, has been announced by Warner Lewis Co., Tulsa. Expansion of facilities includes purchase of warehouse and office building at 817 North Lewis Place adjacent to trackage. The move is coincident with the Warner Lewis announcement that the firm has been named distributor for Gilbert & Barker Manufacturing Co., Springfield, Mass. Warner Lewis represents Viking Pump Co.; Chicago Metal Hose Corp.; Ralph N. Bodie, Inc.; Morrison Brothers Brass Goods; Westco Turbine Pump division of Fairbanks-Morse Co.; John Bean Manufacturing Co.; southwestern division office of Flotrol Systems, Inc.; and other manufacturers of accessories for the refining, pipe line, production and marketing divisions of the oil industry.

McPeake Now in Buenos Aires

R. H. McPeake, formerly export sales manager of Oil Well Supply Co., Dallas, is now in Buenos Aires where he is manager of a newly formed petroleum division of SATIC, Sociedad Argentina, Tecnica Industrial y Comercial. This new division will represent Oil Well Supply in Argentina.

A. A. Azar Returns to Gas Industry

Albert A. Azar has been appointed assistant sales manager of Stacey Brothers Gas Construction Co., Cincinnati, one of the Dresser Industries.

Prior to being employed by Girdler Corp. in Louisville, chief engineer of hydrogen processes and later as chief project engineer of the gas processes division, Azar was connected with the former Western Gas Construction Co. of Fort Wayne. Azar's appointment was made in connection with the company's recent announcement involving a large expansion program.

Patterson Returns to Job

Hill Hubbell & Co. division of General Paint Corp. Cleveland, announces the return of Bryan Patterson to the staff as pipe-line corrosion engineer.

Fritz Taves Returns as Schlumberger Division Manager

Capt. Fritz Taves, a member of the California division staff of Schlumberger Well Surveying Corp. since 1935, has been appointed California division manager succeeding A. A. Perribinosoff. Taves, until recently a captain in the U. S. Naval Reserve, served 4 years with the Navy in various capacities including the post of commanding officer at the Elk Hills Naval Reserve in California.

Middleton Will Sell Onan Products

All products of D. W. Onan & Sons, Minneapolis, are now sold to the oil supply companies by R. L. (Tony) Middleton, direct factory representative. Middleton spent 10 years with General Electric Co. as an oil-field specialist, 11 years with Continental Supply Co. as district manager of machinery sales in Oklahoma, Kansas, and later as director of purchases at Dallas. He resigned that position to join Onan.

Middleton is located at 3317 Lovers Lane, Dallas, until he establishes an office.

Kilberry Named Vice President Of Nordberg Mfg. Co.

F. H. KILBERRY

Nordberg Manufacturing Co., through its president, Robert E. Friend, has announced the election of F. H. Kilberry as executive vice president and director to fill the vacancy created by the resignation of C. E. Stryker, who has been associated with the company since 1940 in the capacity of vice president and assistant to president.

Tivit Moves to New Los Angeles Plant

Bruce Wiswall, general manager of Tivit Products Co., has announced the recent move of Tivit to its new, expanded factory and offices in Los Angeles. Tivit, formerly located in Torrance, Calif., is a division of Kelite Products, Inc., and is engaged in the manufacture of steam cleaning machines, parts spray booths and other equipment for the petroleum industry.

Allen Made Thermoid Executive Vice President

Thermoid Co., Trenton, N. J., announces the election of Dwight P. Allen as executive vice president. Allen has been vice president and director of manufacturing operations, and before that as head of sales to car manufacturers.

Daniels in South America

Guy E. Daniels, export representative, left New York recently for a 2-month trip to South America where he will visit the fields of Venezuela, Colombia, Ecuador, and Peru. Daniels represents Wilson Manufacturing Co.; Black, Sivalls & Bryson, Inc.; Green Head Bit & Supply Co.; Gray Tool Co.; Falcon Manufacturing Co., and Sargent Engineering Co.

Trinity Moves to Newark

Trinity Equipment & Supply Co., manufacturers of thermocouple wells, announces removal of general offices from New York City to 605 Broad Street, Newark.

Park Fills New Caterpillar Post

Advancement of Kenneth F. Park, sales development manager of Caterpillar Tractor Co., to the newly created post of engineering consultant on all matters pertaining to the earth-moving field, is announced by H. H. Howard, general sales manager of the company. In his new capacity, Park will serve Caterpillar's three sales divisions which include the entire United States and Canada.

Spoerl Promoted by U. S. Rubber

The appointment of Walter F. Spoerl as general sales manager of the mechanical goods division of United States Rubber Co. is announced by Ernest G. Brown, vice

president and general manager of the company's mechanical goods, general products and "Lastex" yarn and rubber thread divisions. Spoerl succeeds Herman A. Everlien, who died suddenly February 21 after 43 years with the company.

Stuart E. Halliday Joins Consolidated Diesel

Stuart E. Halliday, who for the past 9 years has been connected with Novacal Chemical Co., has joined Consolidated Diesel Electric Corp. to supervise sales and advertising.

The company has recently erected its own building at 230 East Eighth Street, Mount Vernon, N. Y. The new plant has a total manufacturing space of 33,000 sq. ft. Office space will occupy two floors with a total of 6,000 sq. ft.

Kohut Made Sales Manager Of Kemp Manufacturing

Elevation of Frank J. Kohut from sales-engineering supervisor to the post of sales manager at The C. M. Kemp Manufacturing Co., Baltimore, is announced by W. Wallace Kemp, president.

Zurn Announces Changes

Promotion of James Glass, Jr., to vice president in charge of sales, and John H. Schmid to vice president in charge of engineering, has been announced by President Melvin A. Zurn of J. A. Zurn Manufacturing Co., Erie. Glass has been associated with Zurn for more than 20 years in production and sales, having spent several years in charge of the Buffalo office. Schmid, at Zurn for 7 years, was formerly with the engineering department of E. I. DuPont de Nemours & Co., Wilmington.

Also announced is the appointment of Robert M. Campbell as manager of advertising and sales promotion. He joined the company 3 years ago.

Thomas Made Division Sales Manager for Homestead

Homestead Valve Manufacturing Co., Coraopolis, Pa., has appointed William E. Thomas division sales manager in charge of valve sales in the southeastern states territory with headquarters in Atlanta.

Weyerman Joins Hayes Condit

W. C. Weyerman, recently returned from overseas service as radar officer, U.S.N., has become associated with The Hayes Condit Co. and will assist in the engineering and sales of equipment lines. He is a graduate chemical engineer from University of Texas and his previous business associations were with Phillips Petroleum Co., Joseph A. Coy Co., and Frick Reid Supply Co.

Wilson Elected First Vice President of Jessop Steel Co.

Harry Wilson, Jr., formerly vice president in charge of operations, has been elected first vice president of Jessop Steel Co., Washington, Pa. Wilson has been associated with the Jessop company for the past 40 years as general superintendent, works manager and vice president in charge of operations.

Hulse Joins Youngstown Sheet & Tube Co.

Albert J. Hulse, formerly with Carnegie-Illinois Steel Corp. at Pittsburgh, has joined The Youngstown Sheet & Tube Co. as chief engineer. He succeeds J. D. Jones who left the company about a year ago.

English Concern Will Make Alco Heat-Transfer Equipment

Daniel Adamson & Co., Ltd., of Dukinfield, Cheshire, England, will manufacture the complete heat-transfer equipment line of the Alco Products division, American Locomotive Co., it is announced here by President Robert B. McColl.

Under the terms of the affiliation, the English company will establish a division to produce Alco Products equipment. Alco Products division of American Locomotive will do all engineering and designing.

Three executives of American Locomotive—William S. Morris, vice president in charge of steam locomotives and divisional sales; Herman Press, treasurer; and Hugh M. Corrough, director of the Also Products division—recently returned from a trip to England after completing negotiations with the Daniel Adamson firm.

R. L. Green is European manager of the American Locomotive Export Co., Inc., and makes his headquarters at 25 Victoria Street, S.W.1, London.

Galvin Named Sales Head Of LaPlant-Choate

E. R. Galvin, formerly president of Tyson Bearing Corp. of Massillon, Ohio, has been named executive vice president, general sales manager, and member of the board of directors of LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

Sturtevant Reorganization Announced by Westinghouse

Facilities for production of the first industrial and commercial air conditioning systems to be wholly engineered and manufactured by one company were reported by Gwilym A. Price, president of Westinghouse Electric Corp., Pittsburgh.

To achieve these new systems the manufacturing and engineering facilities of B. F. Sturtevant Co., purchased by Westinghouse in September 1945, are being integrated with the facilities of the Westinghouse air conditioning division which has been transferred from Jersey City to the Sturtevant main plant at Hyde Park, Boston.

Ellis L. Spray, Westinghouse vice president in charge of the elevator and air conditioning divisions of the corporation at Jersey City, has been elected executive vice president of the new organization which is known as B. F. Sturtevant Co., division of Westinghouse Electric. G. C. Derry, formerly vice president of Sturtevant, has been elected vice president and general manager, and E. B. Williams, formerly vice president of Sturtevant, continues in that office.

Girdler Appoints Two

Arne Eriksen has been appointed western representative of both the gas processes division and the Votator division of The Girdler Corp., with headquarters in the Russ Building, San Francisco. Allen McKee Bond, Jr., has been appointed to Votator's technical staff.

Hazel Named to New Post By Oil Well Supply Co.

M. F. HAZEL

Appointment of M. F. Hazel as assistant to vice president, Oil Well Supply Co., has been announced by this U. S. Steel Corp. subsidiary. He will be located in Dallas. In his new position Hazel will coordinate production equipment sales and service in all domestic divisions of the company.

Other appointments by Oil Well Supply Co. include the following:

John H. Cooper as West Texas district engineer with headquarters at Odessa.

W. O. Johnson as manager of the company's store at Ville Platte, La.

B. A. August as manager of the newly created South Louisiana-Mississippi sales and service district.

Louis A. Weingart is manager of refinery sales for the Mid-Continent division.

R. L. Humphrey of Dallas as Gulf Coast division tubular representative. Temporary headquarters are at Harvey, La. Permanent headquarters will be in New Orleans when office space becomes available.

D. R. Smith as manager of the Ponca City, Okla., sales office, replacing James A. Hill, who has become district manager of Oilwell's Colorado-Wyoming district.

Minor S. Nicklas as manager of the El Dorado, Ark., store.

Wayland C. Philley as manager of the store in Wichita Falls.

T. E. Dawson as Kansas district manager. F. G. Irick is the district representative.

C. A. Bell, Houston district manager, as division representative.

F. W. Little, assistant manager, tubular department, Pittsburgh, as Southwest Texas district manager.

R. G. Robinson, field salesman, as Southeast Texas district engineer.

T. P. Drummond, district engineer, as division manager of refinery sales.

James E. Shoemake as district engineer, refinery sales.

Two Join Chiksan

Lee J. Laird, vice president and sales manager, Chiksan Co., Brea, Calif., announces the appointment of Ed T. Landgraff as a

E. T. LANDGRAFF

ROY W. SEXTON

member of the sales staff with headquarters in New York City. Landgraff has been connected with Oil Well Engineering Co. for the past 20 years, the last 3 years as American representative.

Associated with Landgraff is Roy W. Sexton who has been a member of the Chiksan sales staff for the past 3½ years.

Fulton Returns to Athey

Announcement has been made by Athey Products Corp., Chicago, of the return to its sales staff of A. W. Fulton who, since January 1943, has served as a commissioned officer in the U. S. Navy.